Telephony.

THE AMERICAN TELEPHONE JOURNAL

Comprising Telephony, American Telephone Journal, Telephone Weekly, Telephone Magazine, Telephone Securities, The Telephone Sound Waves
PUBLISHED WEEKLY BY TELEPHONY PUBLISHING CORP.
608 S. Dearborn St., CHICAGO

H. D. FARGO, President and Treasurer
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Entered as second-class matter September 4, 1908, at the postoffice at Chicago, Ill., under act of March 3, 1879.

Volume 100
Number 11

CHICAGO, SATURDAY, MARCH 14, 1931

Subscription — 10 Cents a Copy
$3 a Year U. S., Cuba and Mexico
$4 Canada, $5 Other Countries

Bell-Owned and Locally-Owned Connecting Companies

Considerable comment has been aroused by the statistics of the American Telephone & Telegraph Co. annual report—published in last week's issue—purporting to show that during 1930 "connecting companies and lines" showed a loss of 267,000 stations.

* * * *

Last year was a tough year, owing to business depression, but the telephone industry fared better than most lines ot business. Telephone companies operating in large cities and industrial centers had more cancellations, in proportion, than those serving smaller communities, and many local companies, in fact, reported healthy gains. This made it hard to believe the Bell report as to "connecting companies" showing such a loss.

A little scrutiny shows that the whole question rests on what "connecting companies" means, and analysis develops the fact that it was not "Independent connecting companies" which showed a loss of stations.

* * * *

F. B. MacKinnon, president of the United States Independent Telephone Association, in a letter to Telephony explains the matter in a most interesting fashion. In passing, it is worth while noting that President MacKinnon classifies the Southern New England Telephone Co. and the Cincinnati & Suburban Bell Telephone Co. as really "Independent connecting companies"—which seems reasonable enough in view of the fact that the A. T. & T. Co. owns only 33.34 per cent of the first named and only 29.72 per cent of the latter.

President MacKinnon's comments on the "loss" follow:

"One of the difficulties that always presents itself in analyzing statistical statements is the difference in the use of terms. This difficulty is always present when an Independent operator attempts to analyze a Bell statistical statement because of the difference in the understanding of the term 'connecting companies.'

For some reason Mother Bell (American Telephone & Telegraph Co.) does not recognize her grandchildren as being of the royal family. She only recognizes as her children those known as the 'Associated Companies'; and for some reason includes in the royal group two of our large Independent companies — the Southern New England company and the Cincinnati & Suburban company—which have only one-third royal blood.

Thirty-eight other Bell companies, having from 80 per cent to 100 per cent royal blood, are thrown into the same classification as the bourgeoisie—the 7,000 Independent companies—and called 'connecting companies.'

To really understand the alignment of the groups, the so-called 'connecting companies' should be classed as 'Bell-owned connecting companies' and 'Independent-owned connecting companies.' By such a classification the misunderstanding of the term 'connecting companies' would be avoided and the two groups — Bell and Independent — would stand clearly apart in any statistical statement. We could then follow the increase or decrease of each group very clearly.

As will be noticed in one of the footnotes in the American Telephone & Telegraph statement, 145,508 telephones were added to the Bell associated companies by mergers, purchases, sales, etc. The net increase of the Bell companies by reason of purchase of Independent companies during 1930 was 13,000 stations.

Therefore, 132,508 stations were transfers from the 'Bell-owned connecting companies' to the Bell associated companies; that is, from the grandchildren to the children of Mother Bell. Among these transfers were the Lehigh company of Pennsylvania, the Gainesboro company of Georgia and the White Mountain and other companies in the New England states.

These 132,508 stations should be deducted from the 267,000 shown as the total decrease of the 'connecting companies' to obtain the estimated number of decreases among the Independent companies. This would leave 134,492 as the decrease in the Independent group; 'estimated' as is indicated by another footnote.

The question then is: Is the American Telephone & Telegraph Co. estimate of a decrease of 135,000 stations by the Independents in 1930 accurate?

I do not think it is, because an analysis

of the December reports to the Interstate Commerce Commission by 73 of the Independent Class A companies shows that on December 31, 1930, these 73 companies were operating 1,429,800 company-owned stations. These same companies December 31, 1929, as shown by their annual reports to the Interstate Commerce Commission, were operating 1,359,332 company-owned stations. This discloses a gain for the year 1930 of 70,458 stations.

Our records show, however, that these companies, during that period, acquired by purchase or merger with their own companies, 64,151 stations so that their net gain for the year 1930 was 6,370 stations.

As these companies operate in all parts of the country and in all sizes of towns and under all sorts of conditions, I think we may regard this statement as a standard to go by in estimating the increase or decrease of stations in the whole Independent group. The loss in stations by the Bell companies has been largely confined to the large cities.

A check of their smaller exchanges will, I think, show that these have at least held their own. This supports our contention that our companies did not, as a whole, lose in 1930. In addition, there was a transfer of 10,000 stations from 'non-connecting' to 'connecting' by the elimination of competition in the territory of the Cumberland Valley company of Harrisburg, Pennsylvania.

It, therefore, seems to me that the estimate of the American Telephone & Telegraph Co. is wrong, and that instead of the Independent group showing a loss of 135,000 stations it will show a small gain, or at any rate, no loss.

* * * *

"Not having had an opportunity to go over the completed statement of the American Telephone & Telegraph Co. in regard to last year's operations and not having access to the figures for the year either of the Bell companies or any of our companies, excepting the A companies, I have endeavored to make a check on these figures by going back over the statistical statements of the Bell companies for the years 1928 and 1929.

In 1929 we made a careful check of the operations of all of the Bell companies of which there were 86 on December 31, 1928. On that date, according to our figures, these 86 companies were operating 14,774,221 stations (including, so as to make the figures comparable with Bell figures, 479,517 stations owned by the Southern New England company and the Cincinnati & Suburban company).

According to the American Telephone & Telegraph Co. report, the Bell associated companies on that date operated 14,524,648 stations, which left 249,573 stations to be operated by the 'Bell-owned connecting companies.' According to the American Telephone & Telegraph Co. statement the 'Bell connecting company' stations in 1928 were 4,672,387. Deducting from this figure the 249,573 operated by the 'Bell-owned connecting companies' the 8,321 'Independent-owned connecting companies' were operating 4,422,814 stations.

During 1929 ten of the 'Bell-owned connecting companies,' with a total of 44,404 stations, were absorbed by the Bell associated companies. This left the remaining 'Bell-owned connecting companies' operating on December 31, 1929, approximately 205,169 stations. According to the American Telephone & Telegraph Co. report covering 1929 operations, the 'connecting companies' were operating at that time 4,682,849 stations. Deducting those owned by the 'Bell-owned connecting companies' we find that 7,735 'Independent-owned connecting companies' were operating 4,477,680 stations on December 31, 1929.

During 1930, as you have noted, the Bell associated companies absorbed from 19 'Bell-owned connecting companies' 132,508 stations so that the 30 remaining 'Bell-owned connecting companies,' on December 31, 1930, were operating 72,661 stations. If our estimate and figures are correct and there was neither loss nor gain by the Independent companies during 1930, they are still operating 4,477,680 stations, connecting with the Bell companies.

These figures for the three years put in more concise form are as follows:

	1928
Bell associated companies.....	14,524,648
Bell-owned connecting companies	249,573
Independent-owned connecting companies	4,422,814
	19,197,035

	1929
Bell associated companies.....	15,414,005
Bell-owned connecting companies	205,169
Independent-owned connecting companies	4,477,680
	20,096,854

	1930
Bell associated companies.....	15,682,059
Bell-owned connecting companies	72,661
Independent-owned connecting companies	4,477,680
	20,232,400

In addition, there are now about 105,000 Independent telephones, such as the Keystone Telephone System of Philadelphia, Pa., that do not connect with the Bell system.

When we receive the complete annual reports of all companies we can verify these estimates, but I am fairly sure that the figures I have given are correct and the estimate of the American Telephone & Telegraph Co. is wrong."

* * * *

Statisticians are never quite up to date with their reports. With changes taking place every day, by the time the figures are collected, compiled and checked, it is inevitable that the situation has altered materially. In other words, it is hard to catch up with changing conditions.

The United States census bureau is a case in point. Its statistics are invariably several years behind the present date.

Now that President MacKinnon has presented his views of the telephone distribution, TELEPHONY invites the Bell statistical division—which is doing a useful work—to analyze it and offer its comments. We think the telephone field will be interested in a "Check and Double Check."

COMING CONVENTIONS

Wisconsin State Telephone Association, Loraine Hotel, Madison, March 17, 18 and 19.

Texas Independent Telephone Association, Fort Worth, Texas Hotel, March 24, 25 and 26.

Iowa Independent Telephone Association, Hotel Fort Des Moines, Des Moines, April 7, 8 and 9.

Ohio Independent Telephone Association, Deshler-Wallick Hotel, Columbus, April 15, 16 and 17.

United States Independent Telephone Association, Southern District, Sheraton Hotel, High Point, N. C., April 22, 23 and 24.

Indiana Telephone Association, Claypool Hotel, Indianapolis, May 6 and 7.

Up-State Telephone Association of New York, Seneca Hotel, Rochester, May 20 and 21.

Pennsylvania State Telephone & Traffic Association, Hotel Penn Harris, Harrisburg, May 26, 27 and 28.

Kansas Telephone Association, The Sunflower Hotel, Abilene, June 2, 3 and 4.

Reason It Out! Think Hard Before Acting

Helping the Newcomer, Combination Man, Trouble-Shooter to Solve Problems by Applying Reasoning Power—Illustration of Action Without Application of Reasoning and of Reasoning from Cause to Effect to Quickly Locate Trouble

By D. H. Townsend

Pull the blueprint to pieces, not the equipment. That's it! The blueprint costs a quarter, the equipment many dollars.

Why is it that so many "combination men" and so-called all-around telephone men will rush into a case of trouble, screw up a relay here, bend a spring or a blade there, change a light, wiggle a key, cut a form, break off a few wires, get all "hot and bothered," and finally decide the manufacturer didn't put the darned thing together right, when ten minutes spent in *reasoning it out,* or pulling the blueprint to pieces, would have saved their peace of mind, much work, ruined equipment and the expense of a real repairman?

A recent case of this is illustrated in Fig. 1, which is a simplex P. B. X. series line lamp circuit, common-battery, with 20 jacks to a strip. The first 15 lights would "come in O. K.," the remaining five would not.

During a rush period, a man was hired on the strength of his own word that he was an all-around telephone man; he had worked for the Bell. Oh, yes, he was a switchboard man, and incidentally he did not want a high salary.

Assigned to this case, he was given a print of the circuit and started to "shoot the trouble." He adjusted the two relays so much that the threads were about stripped on the adjustment screws. Then he saw the relays did not light the line lamps, so he changed the lamps. Next he cut the lacing on the form, and pulled the wires apart, looking for a short-circuit.

Still those five lights would not come in, so he spent considerable time telling his trouble to a Bell wire chief in a city exchange, and incidentally keeping one of the two trunks to the P. B. X. tied up. The wire chief, not knowing the type of board, told him his trouble might be in the jack

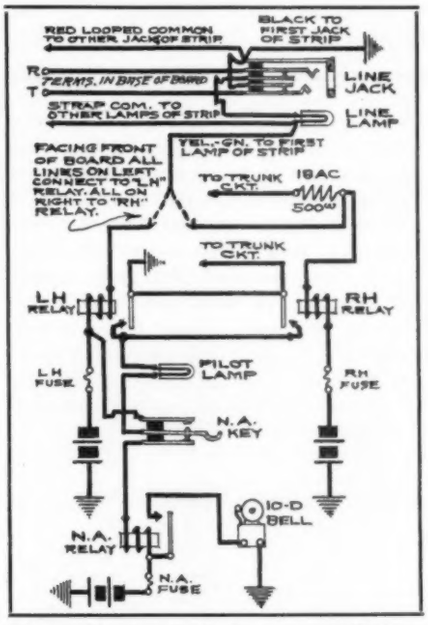


Fig. 1. Simplex P. B. X. Common Battery Series Line Lamp Circuit.

contacts; perhaps they did not make. So the lad poked his screwdriver into the jacks, blew fuses as fast as he could put them in—and still could not clear the trouble.

Finally after he had pulled the strip of jacks out at the rear of the board, his boss appeared and in a *few short minutes reasoned it out on the print* of the circuit that the trouble was something common to those five lights. A simple test quickly showed the ground, "common to other jacks of the strip," was broken off, or rather loose, in the solder where it left jack 15 to loop to jack 16.

The time already spent, together with that consumed putting things together again, meant the firm was billed a half day's time for something which could have been fixed in a few minutes.

The foregoing preliminary is long, but it is an actual case and illustrates the point. You say, "It takes a long time to reason it out," "the prints are complicated," "they are all Greek to me," etc., etc. Are they? Let's see!

Glance at Fig. 2, a wiring diagram, on the theoretical order, of a basic six-relay universal cord circuit found on several hundred boards. The colors of the wires are omitted, likewise all markings except those that appear on the cord rack, relay covers and fuse terminals; fuses are omitted for simplicity, yet the same general style of drawing used by the manufacturer is shown.

Now let's start! Time yourself!

We readily see that, outside the relay numbers and the fact the answering supervisory light connects with the pilot circuit, both ends of the circuit are identical. Therefore, we will pick on the calling end only.

Note that when idle, the tip and ring of the plug are "dead," but are connected together by a circuit traced from the tip through repeating coil windings 3-4, break contacts of relay 1, the 1-2 windings of relay 5, the 5-6 windings of repeating coil and back to the ring of the plug.

The sleeve of the plug is "alive"—that is, the battery through the windings of relay 1 is waiting on the sleeve. As the sleeves or thimbles of magneto jacks are dead, that battery is surely no good on magneto conversations.

What happens when we plug into a magneto line jack? Not a thing! Absolutely no change from idle position until the subscriber "rings off." Then the current from his generator must work relay 5, which is bridged across the circuit like a "ring off"

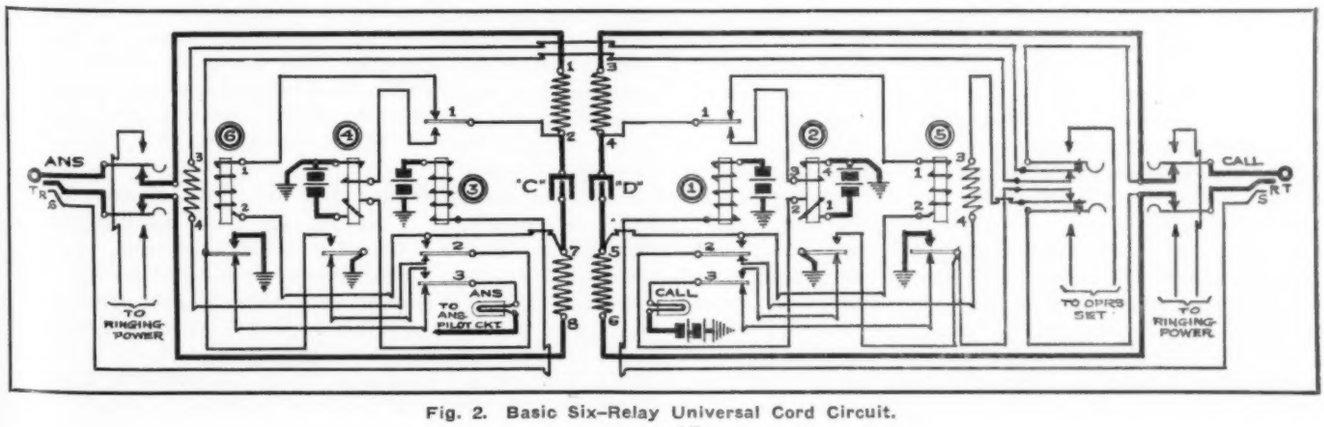


Fig. 2. Basic Six-Relay Universal Cord Circuit.

drop. During the short time this relay is operated, its contacts supply the ground that closes the battery circuit traced from battery through the 1-2 windings of relay 2, break contacts of relay 1, resistance 4-3 of relay 5 and the extra blades of the listening key. Thus we see relay 2 is bound to operate and its own contacts supply the ground to hold itself operated.

What happens now? The "call" light must light through the following path: Battery, light, break contacts relay 1, break contacts relay 5 and make contacts relay 2 and unless the subscriber rings again, that light will stay lit even after the plug is removed from the jack, until the operator, by a momentary throw of her listening key, breaks the relay 2 circuit and restores things to the normal idle position.

We have now reasoned out that, electrically, relay 1 has nothing to do with a magneto conversation and that the resistance on relay 5 is merely to lengthen out the relay 2 circuit, protecting the 1-2 windings and preventing fuses blowing; also that before the plug is removed from the jack, that the subscriber can, by a series of short turns of his generator crank, "flash" the operator; for each time his generator current energizes relay 5, the lamp ground is lifted, the lamp flickers or goes out, coming back on when the impulses stop.

Well, that's simple, but what about a common-battery conversation? Easier yet! Plug into a common-battery line jack; right away that battery waiting on the sleeve of the plug meets the ground on the sleeve of the jack and relay 1 operates, its No. 1 contacts disconnect relay 5 from the circuit, and put the ground through the 4-3 windings of relay 2 onto the tip; its No. 2 contacts put the battery on the ring through the 1-2 windings of relay 2; and its No. 3 contacts close the light circuit through to the ground on the break contacts of relay 2, the lamp lights.

When the subscriber removes his receiver from the hook, it closes the relay 2 circuit through tip, induction coil, transmitter and ring, thus causing relay 2 to operate and put out the light.

We now see that relay 1 is operated the entire time we are plugged into a common battery line jack; that relay 2 is operated only during the time the subscriber's receiver is off the hook; and that relay 5 and resistance are not used in common battery conversation.

The type of ringing used differs according to local conditions, but the basic idea is that the ringing key cuts off all the circuit back of it and puts the ringing current out on the tip and ring.

Now we have "reasoned out" how it works! Did not take long did it? Let's go a bit farther while we have the time to spare, and reason out some simple tests.

Everything was working right when the equipment was installed, and we wish to keep it working that way. Relays do not suddenly jump out of adjustment, and coils nowadays seldom burn out without cause, but cords will wear, lamps burn out, and key blades in a long period of time lose some of their spring, but with relays equipped with dustproof covers, I'd say: "Lay off until absolutely certain it is relay trouble."

By simple tests we mean simple tests any one can make with the equipment found in almost any small exchange, or that should be found there; not current-flow tests, armature travel, contact separation and all that. We will make these tests periodically and record them for comparison:

1. With the circuit idle check resistance from tip to ring of plug, use a direct-reading ohmmeter (Weston No. 563 or similar) holding the test prods firmly against each tip and ring; note the reading. If the 1-2 winding of relay 5 is 500 ohms (as used on the usual rural line board) and the cord is tinsel (not steel and tinsel), we note some 530 ohms.

Is this higher or lower than the last test? How does it compare with the rest of the cords? Thus, we can readily see whether high-resistance faults are developing in the cords, contacts or coils, likewise if any shorts or burn throughs are starting to show up; and knowing our circuit we know where to find our trouble.

2. Touch the sleeve of the plug to any part of the board's framework that is grounded. Relay 1 should operate the lamp light. Then when the sleeve is removed from the ground, the relay releases and the light goes out. If it does not, we suspicion that relay 1 has become slightly permanently magnetized, and that we may need to change its coil.

3. We have found relay 2 does a lot of work, serves several purposes, a mighty important piece of equipment; better check it carefully. Its 1-2 winding is needed in magneto calls, it puts out the light in common battery, it feeds battery to the subscriber's set, and it also acts as a choke or retardation coil to keep the voice currents from being absorbed by or feeding back into the battery, and keeps them in the desired repeating coil path.

We have noted in magneto operation that this relay will work mechanically with just its 1-2 windings in use, but in common battery conversation we must have the 4-3 winding to get the retardation effect.

Several cases of hard-to-locate crosstalk have been traced to battery-feed relays with burned through turns on the coils. The crosstalk was in only when these particular cords were in use.

During non-peak traffic loads, remove the fuses from a few cords at a time—this as a matter of precaution. Connect one side of the ohmmeter to the ground bus bar, touch the other ohmmeter lead to the tip connection of the unfused cord at the cord connecting rack, and with the finger hold the armature of relay 1 in operated position.

Check the battery side with the ohmmeter connected to the individual fuse lug and the ring connection at cord rack. Replace fuses, test other cords.

How do the readings compare with last time? How do they compare with the resistance shown on the manufacturer's print for the windings of the No. 2 relay?

One may from these hints readily reason out other very simple tests, and know just where to find any trouble.

Test 1 would have saved a case of trouble recently investigated. It happened that an improperly cut-back cord had been put in service. A short circuit developed between the tip and sleeve strands. With the cord placed in a common-battery line jack, relay 1 operated and stayed operated; battery flowed through this relay, one-half the repeating coil and the 4-3 windings of relay 2 for a long period of time. The lamp had been removed from the lamp jack, for relay 2 did not pull up enough to put it out.

When a troubleman was called in, the relay cores were still too hot to touch with the bare finger. If those two relays show residual magnetism, is it the manufacturer's fault? No! Had the combination man reasoned it out, he would have soon found his trouble, or tumbled to the fact that the cut-back cord caused it.

These are not "fiction cases" as any one of the old school of switchboard men knows. The object of this article is to help the newcomer, the small combination man, or the trouble-shooter, to find a way to solve his problems by using his reasoning power, thus saving the industry many dollars now needlessly wasted, to render better service and create a better feeling toward the manufacturer of equipment.

Landing So-Called "Fat" Jobs.

Requirements are higher today. But there are just as many opportunities for the fellow who starts out to succeed.

A man must work for the so-called "fat" job. And if you follow the landing of these so-called "fat" jobs, you'll find that the one who landed them has been on the trail a long time; it has been no overnight business. Vision, perseverance, courage, have gone into the making of it; also an understanding of human nature.—James A. McCulloh, president, New York Telephone Co.

Over Half of Fiji Islands Telephones on One Exchange.

According to official statistics released by the Postmaster General of the Fiji Islands, on January 1, 1930, there were 950 telephone subscribers in the colony of Fiji and a mileage in exchange areas of 1,168 miles. Approximately 500 of the subscribers are on the Suva exchange.

An Analysis of A City's Telephone Traffic

An Interesting Presentation of Variations in Telephone Traffic in Rochester, N. Y. and Classifications of Complaints—"Wrong Number" Experience Compared With Dead Letter—Address Before the Rochester Engineering Society

By John P. Boylan,
President, Rochester, Telephone Corp., Rochester, N. Y.

In the telephone business, as in any other business, the telephone corporation plans its future principally on the record of past performance. The traffic department of a telephone corporation is concerned mainly with three general aspects of the business: To increase the efficiency of the service; to assist in bringing about economy in operation; and to furnish the chief engineer with the necessary data to provide additional equipment for growth—far into the future.

The first two items sound rather paradoxical; yet the history of our company over the past ten years has proved that it is possible to greatly increase the efficiency of the service and at the same time effect marked economy in operation. For example, the item of operators' wages per 1,000 calls handled in 1922 was $6.50. Notwithstanding an increase in the wage level, the traffic cost of handling 1,000 calls steadily decreased until it reached $4.40 for 1930, a reduction of 32.3 per cent. Again, the traffic cost per telephone was reduced from $17.50 per annum in 1922 to $11.25 in 1930, a decrease of 35.7 per cent.

So far as the question of the improvement in service is concerned over the past ten years, I am willing to permit you to be the judge. I might state, however, that during the past year our traffic department made upwards of 80,000 tests

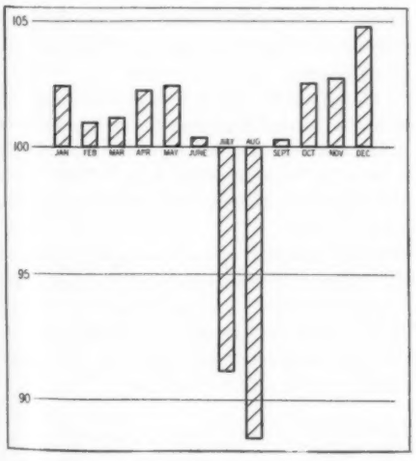


Chart No. 1. Monthly Variations in Originating Traffic in Rochester, N. Y.

and observations of the telephone service in Rochester, and the general summary shows that the average time for the operator to answer was 3.6 seconds, and the average time to disconnect was 3.7 seconds.

My time will not allow me to tell you just how these economies were brought about. It is an intensely interesting story. Generally speaking, the greatest economy in operation has been brought about by our engineers, in collaboration with the engineers of the Stromberg-Carlson Telephone Mfg. Co., adding the super-service features which made our switchboards over 30 per cent more efficient than they originally were. This 30 per cent figure is substantiated by the percentage decrease in traffic costs previously stated.

"The Concentration of the Traffic Load in Business Offices," Says Mr. Boylan, "Suggests One of the Reasons Why the Charges for Business Service Are Higher Than for Residence Service."

The total originating calls on the average business day, in the city of Rochester, is 422,263. There are two busy seasons for local traffic, viz., the spring—April, May and June; and the fall—October, November and December.

The high month for the average business day calls is June, with 454,000; and the low month is August, with 373,000. The heaviest traffic is mostly experienced on days preceding and following holidays, averaging 20 per cent higher than the average for the year, or 506,000. On the three days just preceding Christmas, the calls averaged 545,000 per day.

The two busy seasons for long distance calls differ considerably from the busy season for local traffic. They are the summer months of June, July and August, and the fall months of September, October and November. The average daily long distance calls for these months are 4,100. The high month for long distance business is November; the high day being 4,245.

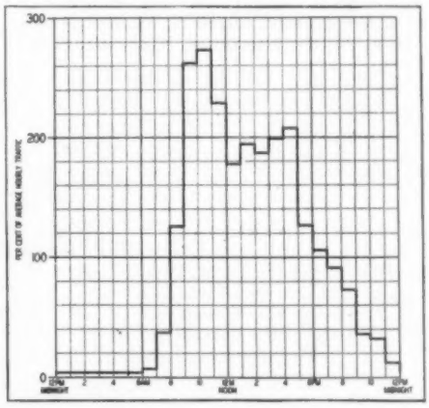


Chart No. 2. Typical Hourly Variations of Business Traffic Based on Records of April, 1930, for Main Office in Rochester, N. Y.

The low month is December; the low day being 3,525.

The number of switchboard positions required to handle Rochester telephone traffic are: "A" board, 310; "B" board, 79; Long Distance, 72; Information, 12; Intercepting and Miscellaneous, 24; a total of 497.

Chart No. 1 indicates typical seasonal fluctuations of Rochester city traffic, based on the experience since 1922. It shows that June is not ordinarily a high month, although it so happened in 1930.

Chart No. 2 shows the distribution of the day's load by hours in the Main office exchange, the great bulk of the traffic being from business telephones. It is characterized by great concentration and a high peak. Chart No. 3 shows a similar distribution of the day's load by hours, in the Genesee office, selected as typical of the traffic in central offices which serve principally residence telephones. The distribution of the traffic is rather more regular; the peak is not so high, and there is a secondary peak in the early evening hours.

On both charts, Nos. 2 and 3, the actual hourly traffic is shown in terms of the average hourly rate.

In the language of the telephone engineer, the load factor of the residence exchanges is higher than that of the business exchanges. In terms of the busy-hour loads shown on charts Nos. 2 and 3, the load factor for the Main office is 36.6

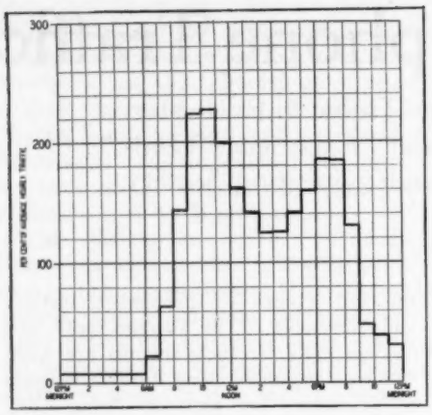


Chart No. 3. Typical Hourly Variations of Residence Traffic Based on Records of April, 1930, for Genesee Office, Rochester, N. Y.

per cent and for the Genesee office 44.0 per cent. The distribution of the traffic in selected periods for these two offices is shown and compared on chart No. 4:

	Percentage of the 24 Hours' Traffic	
	Main	Genesee
1. In the period from 10 a. m. to 11 a. m., the peak period, known in telephone language as the busy-hour*	11.4	9.5
2. For the three morning hours between 9 a. m. and 12 m.	31.8	27.1
3. For the five afternoon hours between 12 m. and 5 p. m.	40.2	28.9
4. For the eight business hours between 9 a. m. and 5 p. m. (This is the sum of items 2 and 3 above.)	72.0	56.0
5. For the 12-hour day and evening period from 8 a. m. to 8 p. m.	90.7	84.1

*The "busy hour" is not usually exactly an even hour by the clock. It occurs somewhere between 9 a. m. and 11 a. m.; generally, but not always, between 9:30 a. m. and 10:30 a. m.

Although not directly shown, it is interesting to note the effect of the secondary evening peak shown on chart No. 3 for the Genesee office. In the three-hour period, from 6 p. m. to 9 p. m., the Genesee office handles 20.9 per cent of its day's traffic; while in the same period the Main office handles only 11.3 per cent of its day's load—about the same in volume as its busy-hour load.

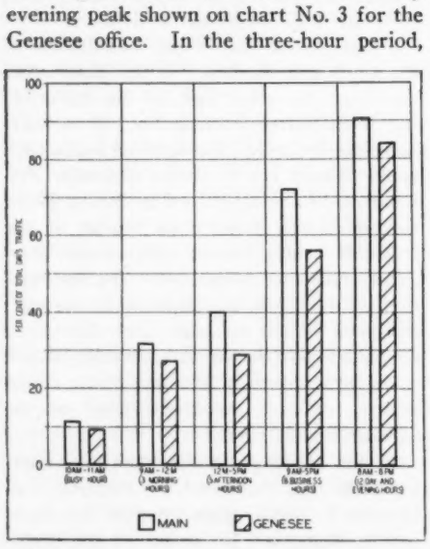


Chart No. 4. Proportion of Total Day's Traffic Originating Within Similar Periods.

The concentration of the load in business offices suggests one of the reasons why the charges for business service are higher than for residence service. Central office equipment and buildings to house it, and inter-office trunks must be designed to handle busy-hour loads. The greater the concentration of traffic, the smaller the percentage of 24-hour possible use. This lack of 24-hour use is one of the costs of the business, and an attempt is made to allocate it to those whose traffic contributes most to it—the business users.

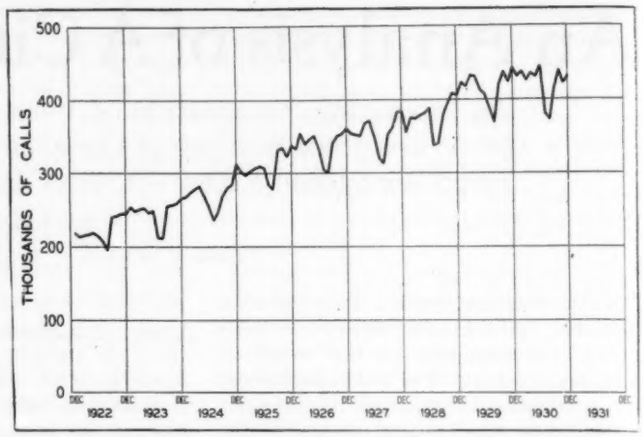


Chart No. 5. Average Daily Originating Traffic Rochester, N. Y.

Chart No. 5 shows the average daily originating traffic in the city of Rochester over a period of nine years. It will be noted that the traffic shows a steady and consistent increase from an approximate average of 220,000 calls per day in 1922 to nearly 425,000 in 1930. Note how consistently the curve dips in mid-summer of every year. Observe also how June of 1930 held up as compared with other years.

The following table shows the class of originating calls, the number and per cent each is of the total, and the number of operators required in handling a call of each type:

Type of Calls	No. of Calls	Per Cent of Total	No. Operators Required to Handle
A-B toll	1,550	0.4	3
Long distance	3,775	0.9	4 or more
Information	5,390	1.2	2
Intercepting	9,215	2.1	2 and 3
Local multiple	117,583	28.0	1
Trunked	284,750	67.4	2
Total or average	422,263	100.0	1.7

It will be noted that the services of an average of 1.7 operators are required in the handling of every call originating in Rochester.

Definitions of Classes of Calls.

A-B Toll: An A-B toll call is a call by number to any one of a group of specified towns. Only number calls to the specified places come under this heading.

Long Distance: A long distance call is a call for a number or particular person in another town or city. No calls to specified group of towns or places are included under this heading.

Information: An information call is a call requesting the telephone number of a certain name and address and is routed by the answering operator over a direct trunk to the information desk for handling.

Intercepted Call: An intercepted call is a call for a number which has been changed, discontinued or never existed, and which must be routed to a second and sometimes a third operator for final and correct completion.

Local Multiple Call: A local multiple call is a call originating and completed in the same exchange.

Trunked Call: A trunked call is a call originating in one exchange and completed over a trunk to another exchange.

A-B toll service is about three times as fast on the average, and 20 per cent cheaper, than the long distance service, for the subscriber when he can talk with anyone answering at the called station.

Where it is necessary to talk to a particular person at a distant number, it is cheaper and faster for the calling subscriber to place his call, specifying the person with whom he wishes to talk, unless he is sure that his party will be handy to the telephone, when a station-to-station call will prove faster and cheaper.

A-B toll service is available to Rochester Telephone Corp. subscribers to 25 towns—listed in the telephone directory—immediately surrounding Rochester and to Buffalo. These calls can be made with the same ease as calls from one exchange in the city to another and with almost the same speed.

The number of A-B toll calls has increased from 750 a day to an average of 1,550 calls a day, an increase of 100 per cent in six months from July 1, 1930, when this class of service was adopted, to January 1, 1931.

Using a local call—the simplest call of all, or a call completed in the same exchange in which it originates—as a measuring stick and giving it a labor unit of 1.0, the proportionate value of the other calls in labor are as follows:

Local calls	1.0
Trunked calls	1.5
Intercepted calls	3.0
Information	4.0
Long distance	12.0 to 15.0
A-B toll	4.7
"B" board and toll switchboard	0.466

If all of the calls originating in the city of Rochester were changed to their equivalent in local calls, the 422,000 calls a day would equal 791,650 local calls a day.

Of the 5,390 calls per day handled at the information desk, 50 per cent is for numbers listed in the book. From three to five extra operators are required at this desk by reason of the failure of subscribers to use the directory. Information traffic fluctuates from 3,600 calls a day just following a directory issue to 6,000 calls just previous to a directory issue.

Ten complete alphabetical records of the subscribers to telephone service of the Rochester Telephone Corp in Rochester, and surrounding territory, also to other telephone companies in 25 towns surrounding Rochester, as well as Buffalo, are maintained at this desk. Ten addendum records of new subscribers and changes of listings since the current issue of the directory closed, plus the telephone book, make up this record.

Telephone listings of new subscribers appear on our information desk within a few minutes of the completion of installation of the telephone.

At the intercepting desks in the city of Rochester, 8,215 calls a day are handled. Of these 8,215 calls only 20 per cent, or 1,642 calls, should properly go there. Of the remaining 80 per cent, or 6,573 calls, 65 per cent, or 4,272 calls, reach there by reason of subscribers' errors; and 35 per cent or 2,301 calls, by reason of errors of the operator. In the language of the postal department, 80 per cent of these calls go to our "Dead Letter" office.

Calling numbers from memory, omitting letters on party lines, putting letters on individual lines and transposing of numbers, accounts for the errors of the subscribers. Transposing of numbers, mis-plugging for inter-office trunks and taking of doubtful numbers, account for the operators' errors.

Of all the calls reaching the intercepting desk in error, about 50 per cent are handled without further inconvenience to the subscriber than again asking what number he is calling; the correct number being then ordered up by the intercepting operator.

An average of 1,067 complaints per month was received during 1930 or an average of 41 complaints per day. The classification and number of complaints of each class are shown for the average day, as follows:

Nature of Complaints	Number of Complaints per Day
Party line trouble	13.8
Called in error	9.6
Slow answers	5.3
Cut-off	3.8
Don't answer	3.2
Miscellaneous	3.2
Equipment	1.6
Third party connected	0.5
Total	41.0

While this number of daily complaints seems large at a first glance, yet 41 complaints out of 422,000 calls handled is only 0.9 of one complaint for every 10,000 calls, or nine complaints for every 100,000 calls.

Party-line troubles rank first in number of complaints and are occasioned almost entirely by a few subscribers of this service through the following practices: *Long conversations; Failure to replace receiver* after conversation, thus not only affecting themselves, but other subscribers as well; *flashing of receiver hook* when other parties on the line have the line in use.

The next item of complaint, in point of numbers, is that of "called in error." These complaints are occasioned almost entirely by subscribers as follows: Calling numbers from memory; transposing of digits; associating exchanges names with localities or with nearby thoroughfares, assuming that because a person lives on Monroe avenue, for instance, that the prefix of his telephone number must be Monroe, when it is quite apt to be Stone—or because he is located on Main street, that his telephone number prefix must be Main, when it might be Culver, Stone, Main or Genesee.

Of the total complaints "called in error" received in a month, we have found by observation and check that only 15 per cent of them are mistakes of the operator, and that 85 per cent are mistakes of the subscriber.

Slow answers, the third item of complaint in point of numbers, must be the fault only of the telephone corporation. They are principally occasioned by the inability of the operating force to give a rapid answering service during occasional surges of traffic.

Fourth in point of numbers in the list of complaints are cut-offs. Five per cent are occasioned by failure of the equipment; 15 per cent by the operators; 35 per cent by the calling subscriber, and 45 per cent by the called subscriber.

Here is an interesting item—"Believe it or not":

The length of conversation of the average telephone call in Rochester is three minutes. If at 12 o'clock midnight on January 1, 1931, the subscribers of Rochester had started to call and continued in succession with no loss of time between calls, and each one were to talk three minutes, the last conversation would finish on Sunday, May 28, 1933, at 24 minutes after four o'clock in the afternoon, covering an interval of about two years and five months.

Referring back to the statement that 85 per cent of wrong numbers is due to telephone subscribers, it might be interesting to compare our experience in this respect with that of another great national communication agency — The United States Postal Department. I am now quoting from the report of a postal official:

The records show that during the fiscal year ending June 30, 1928, there was received at the Dead Letter office registered mail to the number of 11,358 pieces; ordinary mail 23,637,686, making a total of 23,649,044 pieces of mail.

When this mail was opened for disposition, there was found $20,655.88 in loose postage; $98,678.17 in bills and silver currency; and drafts, checks, money orders, etc., amounting to $5,129,836.94, or a total value in the Dead Letter mail of $5,249,170.99.

In the parcel post department of the Dead Letter branch, there were received 461,441 pieces. Of this number, 113,643 were finally delivered. The balance was sold or destroyed, as the value of the contents would indicate, and the proceeds of the sale amounted to $94,752.52.

All of which goes to prove that the American mailing public is extremely careless. The interesting feature of the Dead Letter office report, to a man who is at all familiar with postal work, is the fact that the mailing public could put the Dead Letter office out of business in any one year if they would simply comply with instructions and furnish a return address on the upper left-hand corner of each individual piece of mail.

The postal records indicate that for every 100 misdirected letters, the local post office clears about 67 by either securing the correct address and forwarding the letter to its destination, or returning the letter to the sender. The balance, or about 33 per cent, is forwarded to the Dead Letter office at Washington. It follows, therefore, that if 24 million pieces of mail are received in the Dead Letter office in a year, this number represents only one-third of the actual misdirected mail and brings the total to a staggering 70 million.

The question might be properly asked:

THOSE WRONG NUMBERS

In an editorial entitled "Those Wrong Numbers," the Rochester Democrat and Chronicle had this to say concerning Mr. Boylan's paper:

"President Boylan of the telephone company upset some of the pet notions of telephone users with his facts about the telephone traffic in this section. It was unkind of him to report that 85 per cent of the errors in the calling of numbers are the subscribers' own fault, with only 15 per cent attributable to operators. Everybody who uses a telephone knows that the operator is always to blame.

He was a bit ruthless, too, in disclosing the fact that virtually half of the persons who call 'Information' for numbers have neglected to look in the telephone directory for the desired number. This exposes a pet habit of large numbers of our more easily exhausted residents, who cannot be bothered with looking through a directory.

Mr. Boylan had something to report about persons who engage in endless conversations over party lines, those who try to recall numbers by memory and denounce the operator when she gives them the wrong party, those who persistently transpose numbers or give the wrong exchange and those who slow up service by refusing to answer their telephones. Without actually accusing the public of anything, he seemed to intimate that if it wasn't for the public, the telephone service would be a pretty efficient enterprise. And the worst of it is, he is probably right."

What price must the government pay for the thoughtlessness and carelessness of its people in misdirecting mail?

My estimate would be not less than 20 million dollars. If an individual is careless in addressing an envelope, especially one that contains money or its equivalent in value, it is reasonable to assume that this carelessness would obtain an even greater degree in making telephone calls.

Here is a thought I should like to leave with you: At some time or another each of you receive a letter with your address thereon, but intended for someone else. Surely this is not the fault of the mail carrier, and it would never occur to you to place the blame on him. I am asking that the same consideration be given the telephone operator.

When you are called to the telephone in error, ask the calling party what number he asked for. If he repeats your number, then you know that the calling party is to blame and not the telephone operator. The mailman has no choice but to deliver the letter to the address designated; the telephone operator has no choice but to ring the number requested.

At the present time the United States Postal Department leads all national communication agencies with approximately 26 billion pieces of mail handled annually. The telephone industry is a close second with over 25 billion telephone conversations held annually.

Inasmuch, however, as the ratio of increase in mail matter is running about 4 per cent annually, while that of telephone conversations averages 6 per cent increase per annum, it will not be long before the telephone industry will head the list of national communication agencies.

A Correspondence Course Pays

Excellent Opportunity Offered by Correspondence Courses to Obtain Technical Knowledge at Same Time Practical Training Is Received—Self-Improvement Is Necessary Now

By John A. Bracken

The correspondence course offers an opportunity to obtain technical knowledge at the same time practical training is being received. One may, through a correspondence course, study the science of telephony while he is actually engaged in this work. The telephone plant man may study such subjects as electricity and magnetism while he is working with circuits and relays, and hence has an opportunity to try out what he learns, bringing it into practice before he forgets it.

It is in this way—that is, when a person studies in the line of his everyday occupation or profession—that additional education by means of a correspondence course is of great value. This value is, however, sometimes questioned by those ardent supporters of the "school of hard knocks" who cite instances of persons who have succeeded without additional education—or failed with it.

It may be obvious that the best of education is no assurance of success. It is equally apparent that many succeed without additional education, but what are the relative chances? What are the odds?

The odds certainly seem to favor those with the additional education. The fact that a great number of people take instruction in their field of work by means of correspondence courses, and that many of our best universities are giving extension courses by correspondence, proves that this kind of education is valuable and does pay in terms of self-improvement.

Self-improvement may be said to be the yardstick with which one's ability as a worker is measured. Whatever one may gain at any period, whether in skill or knowledge, should be promptly funded into something actively employed in gaining new skill and knowledge. Skill in any particular calling depends largely upon acquiring habits which give capability.

Self-improvement is one of the things a man in the telephone industry should live by. There is a deep truth back of the expression, "the man who is armed with knowledge, and knows how to use that knowledge in his daily work, is doubly armed."

There is nothing so pathetic as the person who has used his leisure time just for entertainment and finds that later in life he is behind the times in self-imprisonment, lagging somewhere back of the procession of which he is a part.

Take the case of Mr. X as an example. He entered the telephone industry without much knowledge of anything that could be readily applied to the job given him, except it be the willingness to work. As the years went on, the industry grew and Mr. X eventually found himself a member of a large and growing organization. Did Mr. X realize the vast changes the organization employing him had gone through during the years of service?

Perhaps he did; he thought, however, that experience made up for the lack of additional education. He looked upon textbooks relative to telephone practices, as the work of mere theorists. To him, telephone trade magazines and journals were filled with fads, and advertisements with new fangled ideas about the business. A university extension training course by correspondence was something he could not or would not afford. And then what happened?

Gradually Mr. X began to feel that he was out of tune with his particular line of work. Somehow, he realized that methods and practices were becoming considerably different; that the old order had changed—and he had failed to change with it. At length, came the inevitable. He was tactfully informed that a more progressive man, one up to the latest development of his job, was to replace him, and that he must necessarily step aside.

This story of Mr. X is cited as a comparative case. Mr. X as the term implies, is unknown. But like him, there are those who have failed through lack of study to keep abreast with the progress in their particular line of work.

Change is ever-present in the operation and progress of a telephone system; and no matter how long one has been in telephone work, he always should feel that he can learn more about this business.

"Check" means dollars in the business world, and it is a golden word in industry. To "check" oneself in what is known and what should be known about the work in hand, is just as important as the work.

Time invested in further education pays great dividends. There is just so much time—that is one thing of which we all have an equal amount; 24 hours each day—and the disposal which is made of this time now will indicate what one will be able to do with his time later on.

The savings on the investment of time are much more important than the savings on the investment of money. Money spent on courses of additional education, on textbooks, on subscriptions to journals relating to the telephone industry, returns a high rate of interest—and it pays liberal dividends in the satisfaction of work well done.

Texas Operator on Local Operating Correspondence Course.

Charles C. Deering, secretary-treasurer of United States Independent Telephone Association, Des Moines, Iowa, received a letter recently which pleased him greatly. Mr. Deering has charge of the correspondence courses for operators offered by the association. A Texas operator, who had just received her diploma, wrote him telling how proud she was of it.

"The local operating correspondence course," she wrote, "has been a wonderful help to me. It has increased my interest and greatly improved my work. The course contains everything essential that goes to make a courteous and efficient operator.

"An operator does not know what a pleasure it is to operate until she has completed this course. I wish all operators could see the absolute necessity of taking this local operating correspondence course. With pride I want to thank the personnel of the instructing staff for this wonderful opportunity which has benefited me so much."

Toll Dial Network for Fort Wayne, Ind.

New Toll Dial System, Proved Satisfactory After Two Years' Operation in a Tributary Office at Fort Wayne, Enables Subscribers to Complete All Toll Calls by Dialing One Operator Who Dials the Called Number Direct

By H. M. Bruckhart,

Traffic Engineer, The Home Telephone & Telegraph Company, Fort Wayne, Ind.

A new suburban toll dialing network for Fort Wayne, Ind., which was recently cut into service, includes a number of new and interesting features for the handling of short-haul toll traffic. These features include centralization of all toll and special service traffic and the separation of the toll traffic into two distinct classes.

The layout of the telephone network covering Fort Wayne and the surrounding towns is typical of almost any medium-sized city in the United States. Fort Wayne with approximately 34,000 stations has an up-to-date dial telephone plant with rapid toll service to all connecting toll points. A large majority of the toll business originating in Fort Wayne can be trunked direct to the called point without passing through an intermediate switching point. This means that nearly all of the business can be handled on a non-hang-up basis, providing a very satisfactory grade of service.

In the territory adjacent to Fort Wayne there are seven suburban offices, located at Churubusco, Huntertown, Harlan, Leo, Monroeville, New Haven and Roanoke. These seven offices are located from 6 to 20 miles from Fort Wayne and were until recently operated on a magneto basis with the local operators also handling all toll service. This resulted in a much slower toll service to the patrons of these offices than to the Fort Wayne subscribers.

All calls except to Fort Wayne or other tributary offices originating in these suburban offices were passed to the toll operator in Fort Wayne who handled the call. On only a small portion of these calls was it possible to complete the call by the CLR method. This was also an inefficient method from an operating viewpoint as it required the attention of both the tributary and toll center operator until the connection was completed.

On calls from a tributary office to Fort Wayne or from one tributary office to another tributary office, the ticket was not passed to the toll center operator, but the services of two or three operators were required to put up the connection. The rate on this class of calls runs from 10 to 20 cents, by far the majority of the calls being to 10-cent rate points.

To handle these calls by the regular toll method was not entirely satisfactory as the operating costs absorbed practically all the revenue. The cost of putting up a connection on this short-haul traffic was practically the same as for distances ten times as great.

If the operating costs were figured at seven cents per call, then on a ten-cent call there would remain a net income of three cents per call on ten miles of toll line. On a call to a point 100 miles distant, the rate would be approximately 60 cents. Subtracting seven cents for operating costs leaves 53 cents or 17 times as much net income on a circuit only ten times as long.

Mr. Bruckhart Interestingly Tells How the New Toll Dial System at Fort Wayne, Ind., Has Helped to Speed Up Toll Calls.

In view of such conditions it was apparent that some change was necessary in the handling of the short-haul traffic to prevent it from becoming a burden on the other exchange services.

Decision already had been made to change the local service in these tributary offices from magneto manual to full automatic dial service, in line with the service and operation of the city of Fort Wayne. One of these tributary offices had already been operating on dial service for about two years with entirely satisfactory results. One operator position, however, was retained for handling all toll and special services such as information and complaint.

Toll calls originating in this dial office were handled the same as in the magneto offices. This position was located in Fort Wayne in the same lineup with the information positions, and some economy of operation was made by combining this position with the information positions during light load periods.

With dial equipment in all of the suburban offices, it would have been a simple matter to route all "operator" calls to a centralized toll board in Fort Wayne with considerable economy over the present layout, due to handling all of the traffic on one board. However, the operating effort required per call would have been approximately the same as before.

In order to cut down the operating costs on the traffic between our suburban offices and Fort Wayne, it was decided to handle this class of calls by the two-number method and all other toll calls by the regular toll method.

To further speed up this service, it was decided to handle the suburban traffic at a separate group of toll positions. These positions are equipped to handle calls to Fort Wayne and suburban points only, as all other points are reached through the regular long distance board. To separate calls to the suburban positions from calls to the long distance positions, subscribers were instructed to dial one code to reach the suburban board, and another to reach the long distance board.

As all suburban subscribers are listed in the Fort Wayne directory and only one directory used for all offices, subscribers were instructed to call the suburban board for all stations listed in the directory, and the long distance board for all other points. After the first few days, very little trouble was experienced from calling the wrong operator.

Information, Repair and Official calls are also routed direct from the subscriber to centralized positions in Fort Wayne without passing through an operator. To provide for centralizing these services, it was not necessary to provide separate groups of trunks from the suburban offices for each service. All trunks from the suburban offices terminate on dial switches in Fort Wayne through which calls are routed to the various positions in accordance with the last figure dialed by the calling party.

On a call from New Haven, the subscriber dials "03" for the suburban operator, "05" for the long distance operator, "08" for the repair clerk, and "09" for information. The dialing of the "0" selects

an idle Fort Wayne circuit and extends the call to the Fort Wayne switching equipment; and the dialing of second figure "3," "5," "8" or "9," determines the position to which the call is to be extended.

The suburban positions also handle all traffic from Fort Wayne to the suburban offices, subscribers dialing "0" for the suburban operator and "110" for the long distance operator.

The operation of these suburban positions is somewhat different from ordinary two-number toll in that the operator who records the call also completes it. When a call appears on the suburban board, the operator answers and records the called number. Without waiting to get the details on the calling party she plugs into a dial jack and dials the called number. While waiting for the called party to answer, she records the remainder of the ticket.

This method of recording the called party first is in line with the practice recently adopted for regular long distance service and helps to speed up service. The toll tickets used for suburban service are similar to A-B or two-number toll tickets and require considerably less recording than standard toll tickets.

After a call has been set up, the operator does not wait for the called party to answer if another call is waiting, but takes care of the second call. Answering and disconnect supervision are provided on all calls to suburban stations and the operator times the ticket from the supervisory lights. Subscribers calling through the suburban board receive the ringing or busy tones from the called office the same as on the local calls so that they can tell the exact status of the call at any time.

The New Two-Position Suburban Switchboard at Fort Wayne, Ind., Enables the Operators to Handle More Than Twice the Number of Calls as on Straight Toll Operating.

The ultimate plans for handling this traffic are to educate the calling party to hang up without instructions from the operator in case of "Busy" or "Don't answer" and originate another call later on, as on local calls. The operating practice described covers station-to-station service which constitutes about 90 per cent of the business on the suburban board. Person-to-person service is also given but not encouraged, and subscribers are shown the advantages of calling by station.

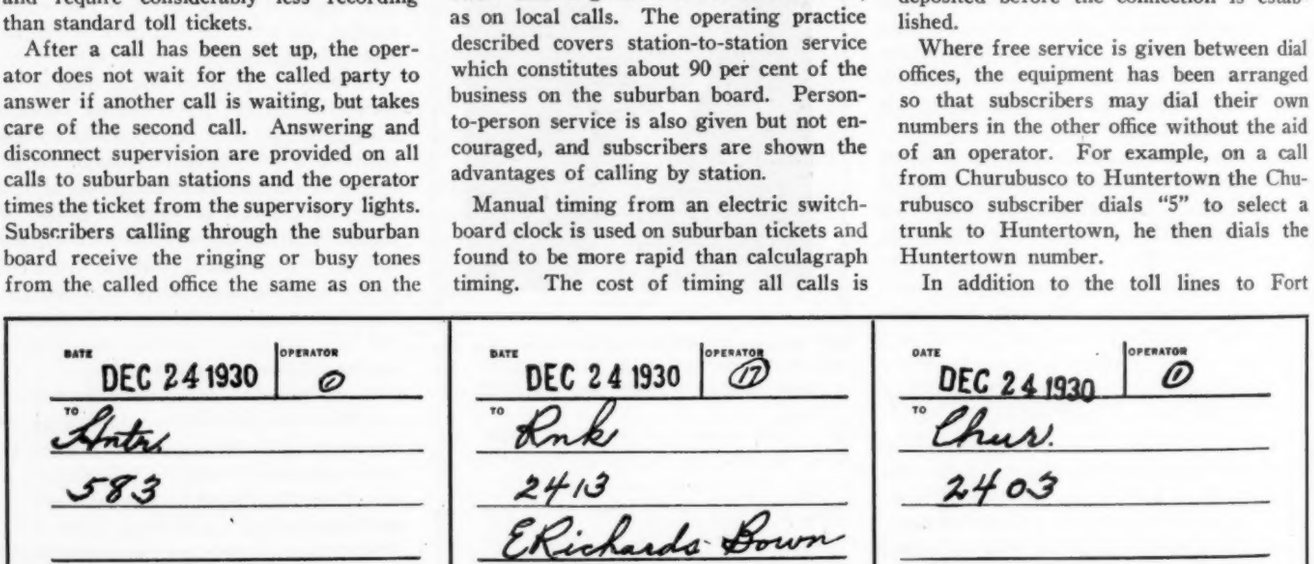
Manual timing from an electric switchboard clock is used on suburban tickets and found to be more rapid than calculagraph timing. The cost of timing all calls is greater than the overtime revenue obtained but some degree of timing is necessary to prevent abuse of the toll lines.

As to speed and economy of operation, the operators on the suburban positions are handling more than twice the number of calls per position as on straight toll operating. The number of operators involved in putting up a connection has been reduced from two or three to one, and the time required to set up the connection reduced accordingly. Where the calling party gives the details of the call correctly, the connection can be set up and the called party's bell rung in less than 15 seconds from the time the signal appears on the board.

To provide pay-station facilities in the suburban offices, to take the place of the pay-station service formerly given at the manual offices, regular postpay coin-box telephones have been installed at convenient locations in stores and restaurants in these towns. These lines are so arranged that when the toll operator answers, a high-pitched tone is heard on the line for approximately two seconds, indicating to the operator that the necessary coins must be deposited before the connection is established.

Where free service is given between dial offices, the equipment has been arranged so that subscribers may dial their own numbers in the other office without the aid of an operator. For example, on a call from Churubusco to Huntertown the Churubusco subscriber dials "5" to select a trunk to Huntertown, he then dials the Huntertown number.

In addition to the toll lines to Fort



Sample Toll Tickets Used on the Fort Wayne, Ind., Suburban Toll Board. From Left to Right They Are: Station-to-Station Ticket, Call Completed CLR; Person-to-Person Ticket, Call Completed; and Collect Call Ticket, Completed CLR.

Wayne, nearly all of the suburban offices also have toll lines to one or more offices operated by other companies. It was not considered advisable to abandon these lines and route all calls through Fort Wayne, as this would have increased the toll circuit mileage on calls from a suburban office to a connecting office by as much as 50 miles in some cases.

Arrangements were made with the connecting companies to handle all outgoing calls from our offices, including the ticket work previously done by our operators. Subscribers in the suburban offices dial a special code to reach the connecting office, and the operators in these offices time and ticket the calls. Dials have been installed on the connecting office switchboards and the operators dial their own numbers in the suburban offices. They also dial through the suburban offices into Fort Wayne to reach the suburban or long distance operators.

The number of dialing codes necessary in the suburban offices to call the various connecting company and special service operators ranges from five to nine. In Churubusco, for example, the codes "5," "6," "7," and "8" are used to reach connecting offices and "03," "05," "07," "08" and "09" to reach the Fort Wayne toll and special service operators. A carefully worked-out program of educational and publicity work has resulted in very little trouble from subscribers becoming confused by the various codes.

With this arrangement, subscribers in the suburban offices place their toll calls directly with the toll operator in Fort Wayne without passing through a local operator and receive the same toll service as Fort Wayne subscribers. This provides an improved toll service to all suburban subscribers and reduces the operating costs.

LIGHT IN THE CANDLESTICK

By Miss Anne Barnes

Traveling Chief Operator, Iowa Independent Telephone Association, Des Moines, Iowa

Light was one of the first thoughts of the Creator for the safety and comfort of man. When He looked down upon the earth He had just created, and saw how black and cheerless a place it would be for folks to grope around in, He said, "Let there be light." So He made two great lights: The greater light to rule the day, and the lesser light to rule the night. And He set them in the firmament of heaven.

The greater light was powerful enough to light up the whole earth so that man could see where he was going and what he was doing. The lesser light served as a night lamp so that man would rest better and more safely after his day's labor. Lastly, He "made the stars also" and decorated the sky with them.

This world is pretty old and, no doubt, it is going to be a great deal older, but those two great lights are shining as brightly as ever, because they were made to endure for all time—the best from the beginning.

But the last word in man-made light—and we wonder how it could be better—will not satisfy the next generation. It will have something so much better that our present-day lighting system will flicker in comparison. That is the way it has always been. Our minds need not travel back many milestones to visualize man's best efforts of a certain generation—candlelight. A few old folks, who have lived over into the present generation, can tell us of those candlelit days.

A recent article in a newspaper told of one big night in San Francisco, back in '47, when the news was received from Mexico of General Zachary Taylor's victory over Santa Anna in the battle of Buena Vista. Quoting the California Star, San Francisco's newspaper of those days:

"The first grand illumination of the town of San Francisco took place yesterday evening in honor of General Taylor's achievement. Every dwelling, store and tavern shone in a blaze of splendor." This was just 84 years ago. "Light is light, whoever holds the candlestick," says Edward Everett Hale.

MORAL: The next generation will not be satisfied with the present-day light in the candlestick. It will have something better.

Indiana Association Announces Conference and District Meetings.

The Indiana Telephone Association, of Indianapolis, has completed plans for its ninth annual plant conference and several district meetings to be held this month and in early April. Varied programs have been planned for these several meetings.

The plant conference will be held at La Fayette on March 18 and 19 under the auspices of Purdue University in the Electrical Engineering Building. An interesting program has been arranged for this meeting of plant men as follows:

WEDNESDAY, MARCH 18, 11:00 A. M.

Registration in the Electrical Engineering Building.

WEDNESDAY, 1:00 P. M.

Inspection trip through the Electrical Engineering Building, with J. W. Stafford, instructor in electrical engineering, Purdue University, presiding.

WEDNESDAY, 2:00 P. M.

Welcome address by A. A. Potter, dean of engineering and director of the engineering experiment station and extension department.

"Electrical Engineering Building Improvements," by Prof. C. F. Harding, head of school of electrical engineering.

"The Executive in the Telephone Business," by F. O. Cuppy, manager, La Fayette Telephone Co. and director of the Indiana Telephone Association.

"Better Transmission at Lower Cost," by E. R. Moore, transmission and protection engineer, Indiana Bell Telephone Co.

WEDNESDAY, 6:00 P. M.

Informal dinner in the Purdue Memorial Union Building, with President H. A. Barnhart, of Rochester, presiding.

THURSDAY, MARCH 19, 9:00 A. M.

Frank J. Baker, engineer, Home Telephone & Telegraph Co., Fort Wayne, will preside at the morning session. The first address will be, "Some Ideas on Plant Maintenance," by C. R. Abdon, Southern Indiana Telephone Co., of Aurora, Ind.

"Some Rectifier Data of Value to the Telephone Plant Operator," will be given by a representative of the Fansteel Products Co., North Chicago, Ill. This will be followed by a round table discussion of telephone problems and solutions, after which the meeting will adjourn.

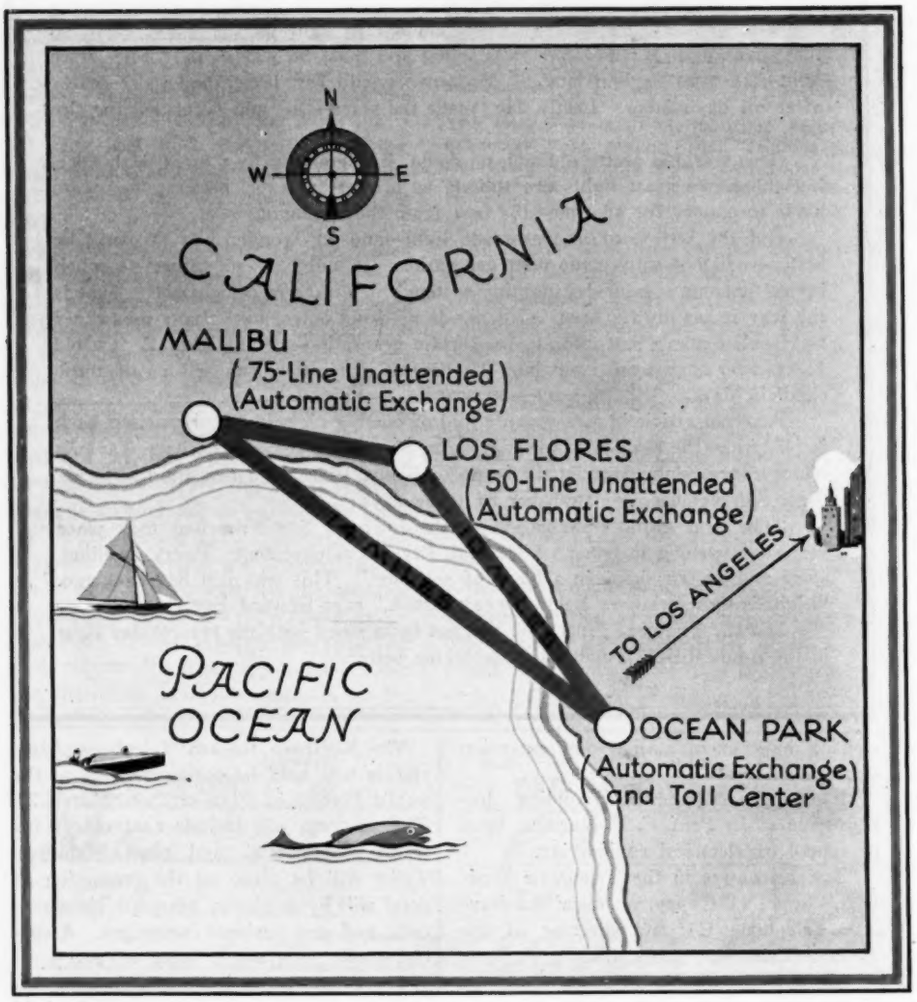
The Northern Indiana Telephone Association will hold its spring meeting at the public library in Plymouth on March 24. The program will include conferences for traffic, commercial and plant employes. Talks will be given on the promotion of good will by employes, adequate plant records, and new business campaigns. A special traffic program is being arranged.

The Southeastern Indiana Telephone Association has planned a meeting to be held at the Dillsboro Sanitarium, Dillsboro, on March 26. The program will include talks by representatives of the Cincinnati & Suburban Bell Telephone Co., of Cincinnati, Ohio.

On April 2, the Northeastern Indiana Telephone Association will hold its annual meeting in the Chamber of Commerce Building at Fort Wayne. A program of special interest to all telephone men and women is being arranged.

The Indiana Telephone Association, of which W. H. Beck, Indianapolis, is secretary-treasurer, urges all telephone men and women in the state to attend the meeting nearest them. Special care is being given the arrangement of the programs which will make the meetings interesting and worthwhile.

FOR SMALL COMMUNITIE



Geographical relationship between the two unattended dial exchanges at Malibu and Los Flores, and the operating center at Ocean Park where toll and special calls are handled.

EVERY small commun s, v
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The upper photograph shows the Strowger unattended dial exchange at Los Flores, California, while the lower one depicts that at Malibu.

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Here and There in Telephone Work

P. B. X. Current Supply; Watt-Hour Efficiency of Battery

By JOHN A. BRACKEN.

By the efficiency of a P. B. X. storage battery is meant the relation of the useful work performed to the total energy expended. This is stated as the ratio between the electrical energy in watt-hours given out, to the energy required to charge the cell to precisely the original condition as it was when the discharge commenced and is termed its watt-hour efficiency. This may vary between 60 and 90 per cent, depending upon the conditions under which the battery as a whole has been charged and discharged. It is expressed by:

$$\text{Energy efficiency} = \frac{\text{Watt-Hours Output}}{\text{Watt-Hours Input}}$$

For example, a normally discharged P. B. X. battery of 9 cells connected in series is charged at a uniform rate of, say, 2 amperes for 7 hours at an average E. M. F. of 2.3 volts. The battery is then completely discharged at a uniform rate of 1.8 amperes for 7 hours, the average E. M. F. per cell being 1.95 volts. What is the efficiency of the battery?

Watt-hours output = 1.8 times (1.95 times 9) times 7 = 221.13.

Watt-hours input = 2.0 times (2.3 times 9) times 7 = 289.80.

Efficiency = 221.13/289.80 or 76.3 per cent.

The efficiency of a storage cell may also be expressed in terms of quantity efficiency, and is given by:

Quantity Efficiency = A. H. output/A. H. input; that is, dividing the ampere-hour output by the ampere-hour input results in the ampere-hour efficiency of the cell.

As amperes do not represent energy, the ampere-hour efficiency is not a measure of a battery's ability to store energy. In the foregoing example, the ampere hours (A. H.) may be found as follows: A. H. output = 1.8 times 7 = 12.6. A. H. input = 2.0 times 7 = 14.0 A. H. Efficiency 12.6/14.0 or 81 per cent.

Due to the fact that the E. M. F. of the storage cell on charge is higher than on discharge, the watt-hour efficiency is lower than the A. H. efficiency. The much lower watt-hour efficiency, then, is due to the difference between the E. M. F. of the charge and discharge.

The A. H. efficiency, which is higher than the watt-hour efficiency, may become as high as 90 to 95 per cent, for electric current is lost only by gassing at the end of charging periods.

The longer a cell is allowed to gas during charge, the lower will be the quantity or A. H. efficiency, for during this period the whole of the wasted current takes part in the decomposition of the water in the cell electrolyte. Should charging of the battery be stopped before gassing commences, the cell might have an A. H. efficiency of nearly 100 per cent; but the desulphation of the active material would be incomplete and, if continued, would reduce the output and perhaps permanently injure the cell.

Local action and external leakage of the current from the cell also affects the A. H. efficiency. When a cell is almost fully charged, it gives off sulphuric acid (H_2SO_4) spray which usually covers everything in its immediate vicinity with a film of acid moisture.

This would cause a leakage of electric current to take place from one cell to another in the group forming the P. B. X. battery by the way of the surfaces of the containing jars, etc.; and if no means be taken to prevent this, the battery might discharge itself prematurely. (There are, however, certain types of P.B.X. storage batteries equipped with an absolute spray-proof feature in the form of funnel vents and sealed jars.)

The A. H. efficiency is not affected by the internal resistance and polarization during the charge of the cell; but as these cause a lowering of the E. M. F. during discharge and an increase at charge, they affect the watt-hour efficiency.

Of the two efficiencies—A. H. and watt-hour—the latter or watt-hour efficiency is of practical importance, since it considers the energy relation and includes the E. M. F. as well as the ampere hours.

If the power used in a part of a P. B. X. circuit is to be measured, the usual method is to connect an ammeter (an instrument in which the value of the current flowing is measured directly in amperes) in that part of the circuit and a voltmeter (an instrument for measuring differences of electrical potential) across that part of the circuit.

The readings—that is, the division to which the pointer is deflected on the instrument's scale—of the ammeter and voltmeter give the amperes and volts, which, when multiplied together, indicate the power in watts. Thus, if a relay in the P. B. X. switchboard requires 0.010 ampere on an 18-volt circuit, the power consumed is $W = IE$ or $0.010 \times 18 = 0.180$ watt.

Again, an electromagnet taking 0.035 ampere on a 24-volt circuit is consuming 0.035 times 24 equals 0.840 watt. By connecting into a circuit an instrument called a "Wattmeter," the average power in watts will be measured.

In Ohm's law it is shown that amperes equal volts divided by ohms, or $I = E/R$. By substitution of this value for amperes in the relation watts = amperes × volts, a similar equation is obtained in the form of Watts equal Volts times Volts divided by Ohms, or $W = E^2/R$.

Similarly, by substituting that portion of Ohm's law in which volts equal amperes times ohms, or $E = I\,R$, an equation is obtained in the form of watts equal amperes times amperes times ohms, or $W = I^2R$.

Example: (a) What is the value of the current flowing in an 18-volt P. B. X. circuit having a resistance of 1,000 ohms including a relay? (b) What is the power consumed in watts?

(a) I equals E/R, or 18 divided by 1,000 equals 0.018 ampere.

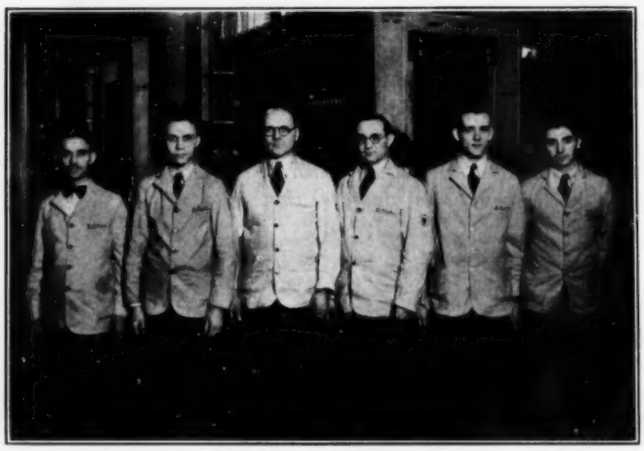
(b) W equals $I\,E$, or 0.018 times 18 equals 0.324 watt.

W equals E^2/R, or 18 times 18 divided by 1,000 = 0.324 watt.

W equals $I^2\,R$, or 0.018 times 0.018 times 1,000 = 0.324 watt.

The last two of these equations are useful in case it is desired to calculate the power in watts when either the voltage or the current value is unknown and the resistance is known.

Problems pertaining to the efficiency of a P. B. X. storage battery:



Employes of the Equipment Room of the Home Telephone & Telegraph Co., Fort Wayne, Ind., Are Now Wearing Jackets While on Duty. The Six Members of the Force Wearing Their New Uniform Jackets, Are Left to Right: Edward Gibson, Harold Bolds, Carl Hedeen, Herbert Miller, Frank Leeper, and Robert Soest.

(1) A current of 0.2 ampere was supplied by a battery of 9 cells for 7 hours. What quantity of electricity has been used? $Q = A \times H$ or 0.02 times 7 equals 1.4 ampere hours.

(2) If this battery has a capacity of 30 ampere-hours, what length of time could the 0.2 ampere discharge be maintained? H equals $A\,H/A$ or $30/0.2 = 150$ hours, or nearly a week.

(3) A P. B. X. storage battery comprising 9 cells connected in series is charged at an average of 2.3 volts per cell for 8 hours, the charging rate being 1 ampere. Assuming the battery to have an ampere-hour efficiency of 80 per cent, for what length of time will the battery light 5 18-volt, 0.648-watt switchboard lamps?

The ampere-hour input is equal to 1 times 8, equals 8 A. H. Since the ampere-hour efficiency of the battery is 80 per cent, the available capacity for lighting the lamps is 8 times $0.80 = 6.40$ ampere-hours. The amount of current required for each lamp is $I = W/E$, or $0.648/18 = 0.036$, and the total current for 5 lamps is 0.180 ampere. Consequently, the length of time that the battery will light the lamps for a continuous period of time is $H = A.H./A$ or $6.40/0.180 = 35$ hours.

(4) What is the watt-hour efficiency of this storage battery if it is discharged at an average of 2 volts per cell?

The input in ampere-hours is 8 and the cells charged at 2.3 volts each. Therefore, watt-hours on charge equal 8 times $2.3 = 18.4$ watt-hours. The cells are discharged at 2 volts. Therefore, watt-hours on discharge equal 6.40 times $2 = 12.80$ wattt-hours. Then since watt-hours

efficiency is equal to $\frac{\text{energy output}}{\text{energy input}}$ or

$\frac{\text{watt-hours on discharge}}{\text{watt-hours on charge}}$, it follows that

the watt-hour efficiency of the battery is equal to $6.40/12.80 = 0.50$ per cent.

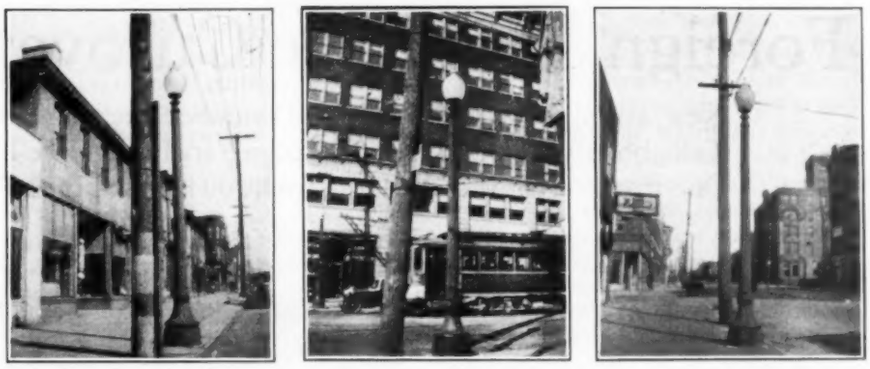
The efficiency of a P. B. X. storage battery varies with the rate both of charge and discharge, and somewhat with the temperature. As high charge and discharge rates produce relatively high I^2R losses, the efficiency is lowered under these conditions. The loss of power in any circuit, equal to the square of the electric current in amperes by the resistance in ohms, is called the I-square R-loss.

"I Wonder Why" of an Observing Traveling Telephone Engineer.

By Ray Blain.

I wonder why some telephone companies will continue to maintain pole lines along certain streets when they know full well that it will not be long before public opinion will force their removal to cables placed underground?

I have in mind a street in a certain city where a white way lighting system was recently installed. It so happened that in many cases the electric light standards were located alongside and very near large poles.



Poles Which Interfere with "White Way" Lighting System; Underground Construction Would Promote Good-Will.

It can be plainly seen that the appearance of the standard will be greatly affected and the full value of the light will not be utilized. At some locations the light standards seemed to be in a forest of poles, and it is small wonder that petitions have not been circulated demanding their removal long before this.

There is no doubt that in many locations aerial cable construction is to be preferred to underground, but it does not seem that this would hold true along a street of sufficient importance to install a white way lighting system. Neither does it seem that a telephone company would care to have its poles seen on such a street.

It would also seem that the company would much rather remove its poles of its own accord than to be forced to do so by public disfavor, because the life of a telephone company without friends is terrible.

A. T. & T. Long Lines Employes Boost Use of Toll Service.

The employes of the long lines department of the American Telephone & Telegraph Co. are this year inaugurating a new plan for selling long distance telephone service as outlined by L. N. Stoskopf, general manager of the company. There are 20,000 employes in the long lines department and complete cooperation is expected from them.

A brief outline of the plan is given as follows: Each employe is to interview two subscriber friends. Provide for each a small book containing the telephone numbers (with matching rates) of his out-of-town friends or relatives. Discuss with him the speed, convenience and low cost of long distance service. Turn in a report of the interviews.

Two telephone number books are given each employe to take along when calling on prospects. The employe should get the necessary information as to out-of-town friends and relatives of the prospects, and enter their numbers together with matching rates in the books provided for that purpose.

In presenting these books to their friends employes will mention a few points on the convenience and value of the long distance service, especially in maintaining social and family contacts anywhere. The company believes that a substantial increase in the use of long distance service will result from this employe sales campaign.

A Practical Hint for Trouble-Shooters; Carry Field Glasses.

A troubleman of the British Columbia Telephone Co., Vancouver, B. C., Can., used a novel means for locating trouble on lines between Nanaimo and Victoria, recently.

Electrical measurements indicated the approximate location of the trouble, and H. Dobinson, Ladysmith plant man, was dispatched to get rid of it. He patrolled the lead, climbing poles and examining wires, but could not see any disturbing factor.

Finally he went back to town and obtained a pair of opera glasses. The glasses revealed what the naked eye could not see—a piece of fine wire touching a telephone wire in the middle of a span and grounding on a tin roof.

War Memorial Placed in New England Telephone Office.

A handsome memorial to the telephone men and women who served in the World War, naming those who died in the military service, has been placed in the lobby of the executive building of the New England Telephone & Telegraph Co. in Boston, Mass.

The memorial is done in the manner of the ancient Greeks. It has a tablet of Botticino marble set in a niche of verde antique marble and inscribed with the company insignia, a note in commemoration of all who served, and the names of those who gave their lives. It has been so constructed that it will be possible to move it to the proposed new building which the company anticipates erecting in Boston at a later date.

Foreign Exchange Cutover to Automatic

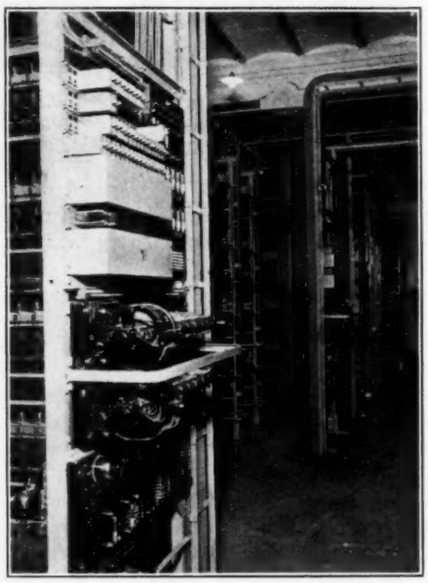
New Equipment Installed in Trindade Exchange by the Anglo Portuguese Telephone Co., of Lisbon, Portugal, Includes Five-Position Complaint Desk, One-Position P. A. B. X. Desk with 200 Lines and 12-Position Information Desk

By S. C. Reade,
Siemens Brothers & Co., Ltd., Woolwich, England

On the evening of Saturday, August 30, 1930, in the presence of General Carnoma, the president of Portugal, and a distinguished gathering, the Anglo Portuguese Telephone Co., which operates the telephones in the city of Libon and its surroundings, carried out the transfer of 6,500 subscribers from manual to automatic working.

The cutover was highly successful and was carried out without the slightest hitch. A further cutover of 1,000 lines has since been made, making a total of 7,500 lines. The present equipment provides for 8,500 lines with 9,200 multiple, thus providing for numbers temporarily unavailable and for growth in groups of P. B. X. lines. Of the 92 final selector groups in the new automatic exchange, no less than 41 are equipped for P. B. X. working.

The automatic equipment was manufactured and installed by Siemens Brothers & Co., Ltd., London, England. It is of their well-known No. 16 type, and displaces Central and Trindade common battery manual exchanges, both of which have rendered excellent service. The old Central equipment was among the first few common battery equipments to be installed in Europe,



The Motor Interrupter Racks Installed at the Trindade Exchange of the Anglo Portuguese Telephone Co., Lisbon, Portugal, Are Equipped with Duplicate Interrupters.

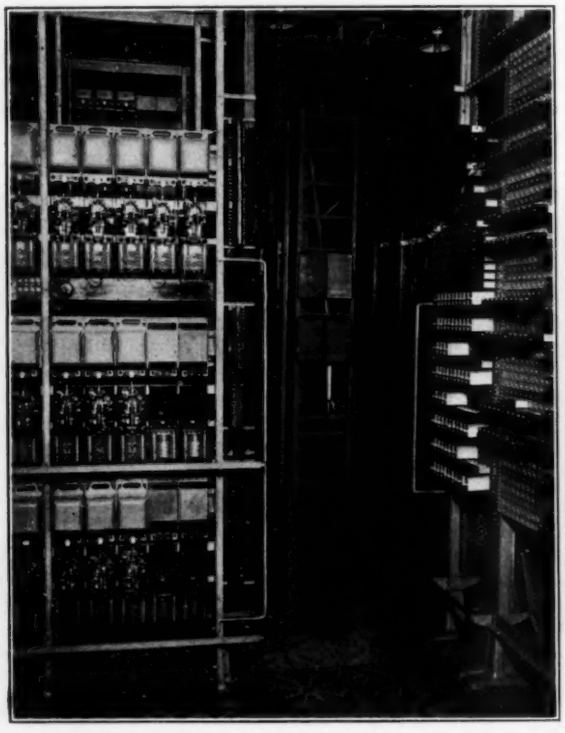
and at its "retirement" claimed to be the second oldest exchange in that continent.

The automatic equipment had to be accommodated in the same building that was occupied by the terminal manual equipment. For this reason it was necessary for the automatic plant to be spread over three floors, and sufficient equipment for 6,800 lines installed to enable the cutover to be made without disturbing the existing manual service. After the initial cutover, the manual equipment was gradually replaced by the balance of the automatic apparatus until provision was made for the total of 8,500 working lines.

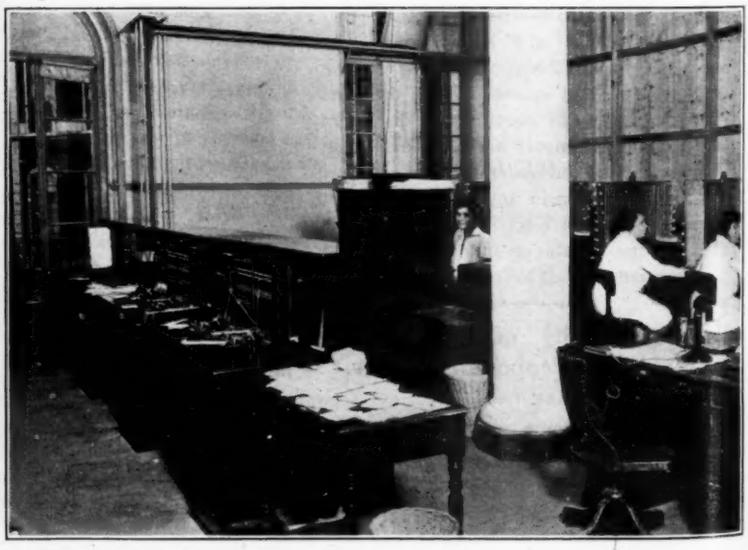
The system uses first and second preselectors of the 10-point type and is operated by a 60-volt battery. All switches are mounted on single-sided open racks, thus providing easy access to the equipment on the one side and to the wiring on the other. The racks are 10 feet in height and are supported on cast-iron feet. This permits of a clear run for cleaning underneath—a great advantage over racks using a base angle.

In accordance with Siemens Brothers' standard practice, preselector distributing frames are provided between first and second preselectors. This enables the number of working lines in any division to be varied should the traffic per line change at any time. The grading of outgoing links from one rank of selectors to the succeeding rank is carried out on centralized link distributing frames. These frames are so designed that rearrangements and rejumpering may be carried out on the frame without interfering with the permanent cabling.

In the Lisbon local network there are, in addition to the new automatic exchange, two common battery exchanges, Norte and



General View Showing Selector Rack and Traffic Meter Rack Installed in the Trindade Exchange.



View Showing Complaint Desk in the Trindade Exchange of the Anglo Portuguese Telephone Co., Lisbon, Portugal.

Belem; three magneto exchanges, Bemfica, Lumiar and P. do. Bisfo, and a toll exchange. Of these exchanges, Norte is the largest, serving nearly 6,500 subscribers and has switchboard equipment of 47 A and 10 B positions.

The inter-operating circuits between these exchanges and the new automatic exchange were designed by Siemens Brothers with the object of providing the simplest scheme at minimum expense. All manual exchanges are dialed direct, and all "A" positions provided with dials for completing calls direct to automatic subscribers.

The existing main frame was utilized and extended. In order to provide convenient testing facilities direct into lines without referring to jumpering records, a special "U" link strip was designed and fitted on the exchange side of the frame. This strip provides similar facilities to a test jack mounting, enabling tests to be made on inside and outside lines independently.

Preselectors and final selectors are arranged in line units, each unit comprising three preselector racks and one of final selector rack, with a floor type sectional intermediate distributing frame in between. Each unit has a capacity of 400 lines.

The sectional intermediate distributing frames are so arranged that the preselectors and the final selector multiple are wired to adjacent tags on the same terminal strip. In the case of straight connections, the preselector and final selector multiple tags are normally connected by bare wire straps, but should traffic conditions demand it, these straps are cut and replaced by jumpers.

Situated in central positions among the automatic racks are motor interrupter racks, each equipped with duplicate interrupters for distributing battery and furnishing centralized drive to the automatic switches.

A fault supervision panel is provided, on which are fitted fault-localizing jacks for tone circuit and lamps to indicate preselector congestion. This panel is also a central point on which all exchange alarms are concentrated.

"Complaints" are dealt with on a five-position complaint desk, each position of which is equipped with eight cord circuits. In addition to the five complaint positions, there is one P. A. B. X. position which deals with the incoming and outgoing calls of the company's P. A. B. X. and with calls to and from the toll board.

The company's P. A. B. X. is a 200-line automatic equipment and was supplied and installed by Siemens Brothers at the same time as the main exchange. It is designed to operate off the main battery and, therefore, has no separate power plant.

A 12-position information desk deals with "Directory Enquiries" for the whole of the Lisbon network.

Duplicate 60-volt batteries are fitted, one of which was made up from the two 40-volt batteries serving the old manual exchange. The switching scheme enables either battery to be used floating whenever desired. A 30-volt power supply for P. B. X. switchboards is arranged for by means of C. E. M. F. cells off the main discharge bus bar.

One motor-generator set is provided for charging the exchange batteries. A second generator set, driven by a gas engine, is installed for use in the event of a breakdown or should the public supply fail.

Int. T. & T. and Radio Corporation Abandon Plan to Unite.

The Radio Corp. of America and the International Telephone & Telegraph Corp. have dissolved the accord reached in March, 1929, for consolidating their communications interests when permitted to by legislation, it was announced on March 5 in a joint statement by General James G. Harbord, chairman of the board of the Radio corporation, and Sosthenes Behn, chairman of the International Telephone & Telegraph Corp.

"This decision was necessitated by the fact that despite the increasing influence of communication mergers in foreign countries and the obvious advantage to American communications interests from consolidation of their services, no legislative action has been taken to eliminate these handicaps or to facilitate the consolidation," the statement said.

"The managements of the two companies have, however, in no way altered their sincere conviction, announced in their public statement of March 30, 1929, that the unification of American record communication services would be to the interest of our country and people."

The original agreement was reached at Paris following negotiations by Owen D. Young, chairman, and David Sarnoff, then executive vice-president of the Radio corporation, and Thomas W. Lamont and Nelson Dean Jay of J. P. Morgan & Co. The offer made for R. C. A. Communications amounted to $105,000,000 at market prices then prevailing.

It was the opinion of those in close touch with the situation that there is no likelihood of a new deal being broached for two years or more for the merger of R. C. A. Communications, Inc., with the cable and radio systems of the International Telephone & Telegraph Corp., unless legislation is changed.

Convention of Southern States Independent Companies.

The United States Independent Telephone Association is to hold a meeting of the Independent telephone companies of its southern district at High Point, N. C., on April 22, 23 and 24. High Point was selected upon the invitation of J. F. Hayden, general manager of the North State Telephone Co. and a director of the association. The headquarters will be at the Sheraton Hotel in High Point.

Independent companies, operating in the nine states covered by the Southern Bell Telephone & Telegraph Co. and also in Virginia and West Virginia, are invited to send members of their operating departments to this meeting as there will be programs of interest to all. Details of the convention will be announced later.

This meeting will afford an excellent opportunity for Southern telephone men to get in touch with others in the same section and promote the interests of the Independents in that part of the country.

What the Commissions Are Doing

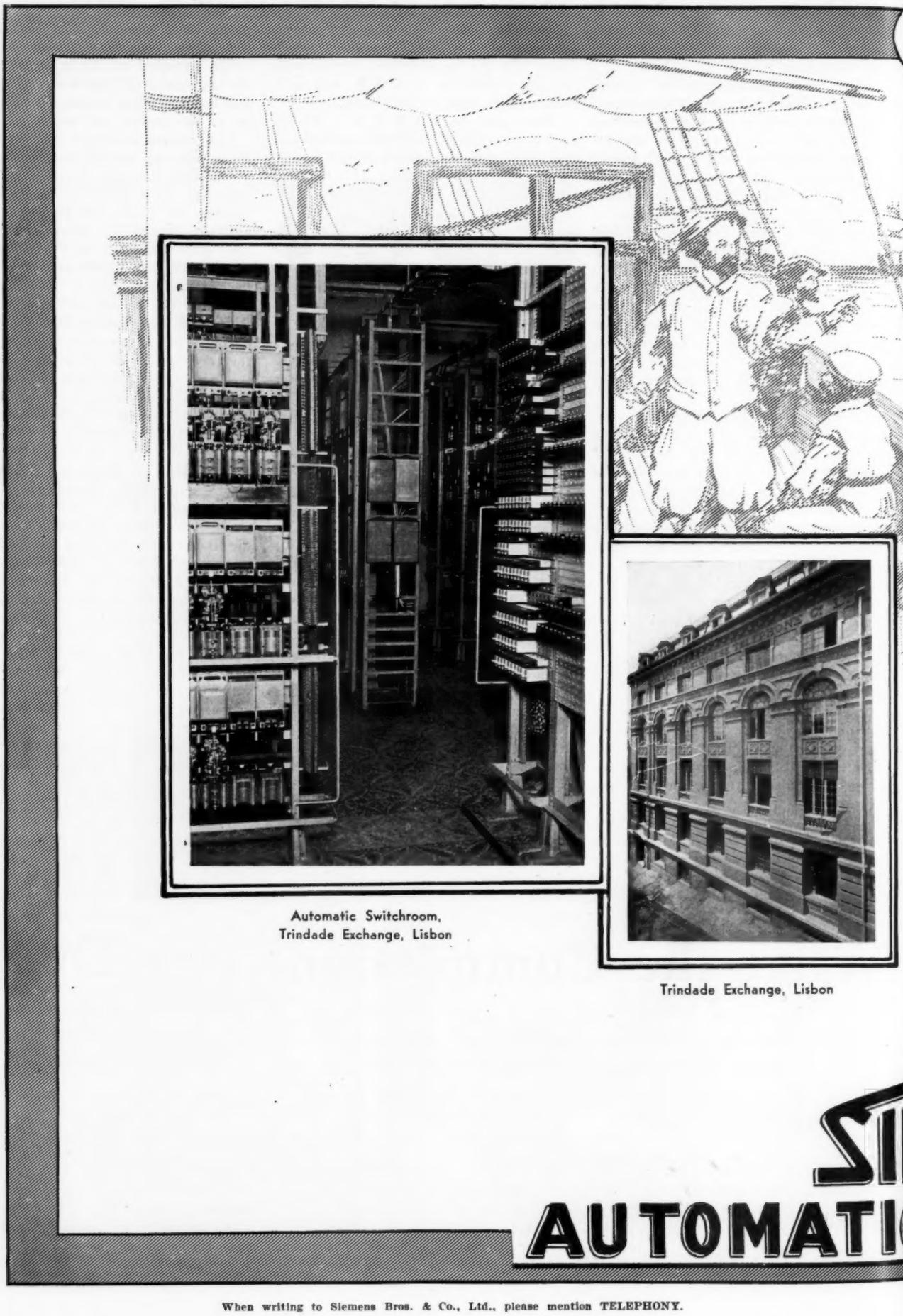
Up-to-the-Minute News Regarding the Activities of State and Interstate Commissions, Courts and City Councils in Matters Concerning Telephone Companies—Summary of Commission Orders and Schedule of Telephone Hearings

Kansas Legislature Passes Bill for Holding Company Regulation.

Jurisdiction over public utility holding companies is conferred upon the Kansas Public Service Commission by a bill (S. 304) passed by the Senate and House and sent to Governor Harry H. Woodring for his approval.

The measure provides that no foreign holding company shall acquire control of a local public utiltiy without first agreeing to submit to the Kansas Public Service Commission in the matter of rates and other transactions affecting the local operating company. Management, engineering and similar contracts are made subject to the approval of the commission.

In ascertaining the reasonableness of a rate or charge to be made by a public utility, no charge for services rendered by a holding or affiliated company, or charge for material or commodity furnished or purchased from a holding or affiliated company, shall be given consideration in determining a reasonable rate or charge, unless there be a showing made by the utility affected by the rate or charge as to the actual cost to the holding or affiliated company furnished such service and material or commodity.



Automatic Switchroom,
Trindade Exchange, Lisbon

Trindade Exchange, Lisbon

SIEM
AUTOMATIC

When writing to Siemens Bros. & Co., Ltd., please mention TELEPHONY.

Lisbon

IN 1519 Ferdinand Magellan set sail from Portugal in command of a small fleet of ships on a voyage of discovery. In October 1520, these ships, led by the famous Portuguese Navigator, passed through the stormy Straights, subsequently named after him, and made the first circuit of the world. Travel and communication facilities have since improved to an extent almost unbelievable, but Portugal is still in the forefront. In August, 1930, General Carnoma, the President of Portugal, in the presence of a very distinguished gathering, cut over the new Trindade (Lisbon) Automatic Telephone Exchange. This is the first public automatic exchange installed in Portugal, and is equipped initially for 8500 lines.

The complete equipment was designed, manufactured and installed by

SIEMENS BROTHERS & CO., LTD.
WOOLWICH, LONDON, S. E. 18

REPRESENTATION ABROAD: Winnipeg, Rio de Janeiro, Buenos Aires, Cairo, Cape Town, Johannesburg, Port Elizabeth, Durban, Melbourne, Sydney, Brisbane, Adelaide, New Castle (N. S. W.), Cavins (Queensland), Perth, Wellington, Auckland, Tokyo, Tientsin, Harbin (Manchuria), Calcutta, Bombay, Madras, Colombo, Ipoh (Perak F. M. S.), Kuala Lumpur, Singapore, Penang, Shanghai, The Hague.

IENS
ELEPHONES.

When writing to Siemens Bros. & Co., Ltd., please mention TELEPHONY.

Such showing shall consist of an itemized statement furnished by the utility, setting out in detail the various items, cost for services rendered and material or commodity furnished by the holding or affiliated company.

Federal Supreme Court Denies Review of Oklahoma Suit.

The United States Supreme Court on March 2 denied the Oklahoma-Arkansas Telephone Co., Poteau, Okla., a review of its suit to force the Southwestern Bell Telephone Co. to restore a connection with its lines at Fort Smith, Ark. The two companies had a contract for joint service which was canceled by the Southwestern Bell company after a dispute on division of toll revenues at Poteau, Okla.

Unable to come to an agreement, the Southwestern Bell Telephone Co. severed the physical connection of the Oklahoma-Arkansas company's lines, terminating toll service. The Oklahoma-Arkansas company brought suit, claiming that it was entitled to have the physical connection maintained on the ground that it had been dedicated to the public use.

The Circuit Court of Appeals for the Eighth Circuit, however, held that it had no such right under the Arkansas statutes requiring every telephone company to "supply all applicants for telephone connection and facilities without discrimination or partiality." Further, it declared, the long continued physical connection of the lines under a contract terminable at will, did not amount to a dedication to the public.

Oklahoma Resolution Proposes Investigation of Toll Rates.

A resolution, H. C. R. 17, authorizing the Oklahoma Corporation Commission to investigate intrastate toll rates and practices of the Southwestern Bell Telephone Co. and associated companies; to make valuations and fix rates, and investigate compensation to other connecting lines and exchanges, was adopted in the house of the Oklahoma legislature on March 2, with an amendment making all provisions of the resolution also apply to Oklahoma-Arkansas Telephone Co.

Oregon Replaces Present Commission with One Commissioner.

The Oregon legislature has passed a bill (H. 77) to abolish the Oregon Public Service Commission and create in its stead the office of Public Utilities Commissioner. This was passed by the House in February 17 and by the Senate on February 26.

The bill which provides for a one-man commission, includes a section authorizing any city or town to fix by contract or prescribe by ordinance the rates of any public utility for periods not exceeding five years.

Any such contract or ordinance must be submitted to the commissioner of public utilities, who may, within 90 days, file with the municipality a finding that the proposal is not in the public interest, in which case the matter must be submitted to the vote of the people of the municipality. Control over rates is vested in the commissioner when the municipality does not act.

All contracts proposed to be made by a public utility with another corporation which directly or indirectly controls the utility, involving construction materials or services, are made subject to the approval of the commissioner.

Hearing on Protests Against Valuation of Ohio Bell Property.

Attorneys for the Ohio Bell Telephone Co., and Attorney General Gilbert Bettman, representing various municipalities of the state, on March 3 presented to the Ohio Public Utilities Commission arguments in the protest filed by the company and the municipalities against valuations fixed by the commission on the Ohio Bell company's property.

The contention is centered around three separate valuations, the company claiming its properties are worth at least $143,000,000, the municipalities contending for a figure not to exceed $91,000,000, arrived at through a series of surveys by state engineers and others employed to make surveys, while the commission January 31 last, held the properties to be worth approximately $104,000,000.

In asking the commission to reconsider its valuation and to set a higher figure, attorneys for the company asked the commission for authority to present additional testimony which, according to W. H. Thompson, Ohio Bell counsel, would deal with the prices paid by the Ohio Bell to the Western Electric Co. for central office equipment, and with the value of long distance equipment used in intrastate and interstate business.

The proposal that such testimony be presented on April 15 was taken under advisement by the commission. This date was granted on March 4 after the company and the state had completed arguments in their protests.

In presenting the company's contention for a higher valuation, Karl Burr told the commission that its valuation figures on some items were incorrect, citing among others the exclusion of land purchased for future improvements.

Attorney General Bettman reviewed the history of the case, and said that the company had "no real quarrel" with the commission for setting the $104,000,000 valuation on the properties. He said that last April the company had been willing to accept a valuation of $107,000,000.

Thomas J. Herbert, Mr. Bettman's assistant, who has been associated with the Ohio Bell case for some time, detailed the grounds upon which the municipalities were asking for a valuation lower than that fixed by the commission.

Subscribing to the petition asking the commission to reconsider its valuation were legal representatives of Akron, Barberton, Bellaire, Canton, Cleveland, Columbus, Coshocton, Dayton, Gerard, Ironton, Kent, Lancaster, Marietta, Martins Ferry, Massillon, Middletown, Niles, Piqua, Springfield, Steubenville, Toledo, Washington C. H., Youngstown, and Zanesville.

Arguments on March 4 were all rebuttal. Karl Burr, company counsel, opened with a general discrediting of H. C. Allensworth's testimony.

T. J. Herbert, assistant attorney general, said that the company since the beginning of the litigation had striven to discredit Mr. Allensworth.

Harold H. Burton, city solicitor of Cleveland, speaking for the various municipalities which were party to the appeal from the commission's valuation, said that Cleveland, and he believed the other cities concerned, was interested in settling the matter with a view to a speedy adjustment of the rate question. "The question of valuation means little to the telephone user," he declared. "What he wants is a final fixing of the rate he pays the company for service."

Attorney General Bettman proposed to the commission that it determine a valuation, but hold it in abeyance pending settlement of the rate controversy, so that if either side wished to appeal to the Supreme Court, both the rate and valuation phases could be appealed at once to save time.

Commissioner Geiger expressed doubt that this could be done, but Commissioner Bricker said there was nothing in the law to prevent the commission using its discretion in such a situation.

Indiana House Kills Bill to Amend Utility Law.

Backed by almost the solid vote of the Democratic majority of the Indiana house of representatives, senate bill No. 23, a measure designed to make more stringent state regulation of public utilities, has been killed. The votes of the 64 members of the majority were cast in favor of indefinite postponement, even though they voted to force the bill out of committee where it had lain for some weeks.

The bill proposed to amend four sections of the Indiana Public Service Commission act. First, it would have extended the authority of the commission to cover all utility properties in rural territories. It would have made the city or town the unit for rate-making purposes and evaluations, not permitting property outside the unit, and not used or useful to local patrons, to be capitalized in rate values.

Another section would have restored the use of all fees collected by the commission to a revolving fund to be used for investigations of utility security, rate and merger cases. Another section and one to which

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there was considerable objection, would have given the commission discretionary power to determine whether proposed utility mergers or consolidations would be in the public interest.

The bill passed the senate by an overwhelming majority on January 28, only three votes being cast against it.

Those against the bill argued that the commission needed no further authority over public utility mergers than it held under the present law. They said it was impractical for the rate base of a utility to be confined to property lying within a city or town, when cities in rural districts were receiving the same services.

They declared the commission needed no revolving fund other than that established by the state budget committee which gives the commission $50,000 for investigations.

The speaker of the house compelled a record vote when he declared he was not certain of the result of the viva voce vote taken first.

Minnesota Legislature Considering Appropriation for Investigation.

Minnesota telephone subscribers have been paying 20 per cent too much to investigated companies, and the legislature should appropriate at least $150,000 for establishing a new rate making base, the Minnesota Railroad & Warehouse Commission recommended on February 21.

The report of the commission was made to the senate committee on telephone and telegraph to which was referred a resolution adopted by the senate two weeks previously, calling for a statement of the telephone companies' valuations in the state and the fairness or unfairness of the rate charged thereon.

On February 26 the senate committee held a hearing to consider the report and action was taken to introduce a bill in the legislature providing for an appropriation of $190,000 for a state-wide appraisal of telephone properties by the Minnesota Railroad & Warehouse Commission.

The senate investigation of telephone rates was launched by Senator Charles A. Hausler of St. Paul, chairman of the committee on telephones and telegraph. The senate by unanimous vote adopted his resolution calling upon the Minnesota Railroad & Warehouse Commission to furnish his committee with all available information on rates, valuations and net earnings of the telephone holding companies of the state.

The report laid before the legislature concludes that:

The Tri-State Telephone & Telegraph Co., of St. Paul, with 30 exchanges throughout the state, has received a return of 15.37 per cent upon its true valuation, when the federal courts have fixed 7 per cent as the fair return.

Preliminary surveys made on a basis of 1928 operations indicate that the legislature should appropriate $205,000 for a revaluation of all group telephone companies in the state, including $10,000 to complete the work in St. Paul, $50,000 for the other 29 Tri-State exchanges, $100,000 to appraise the 89 exchanges of the Northwestern Bell company, including Minneapolis and Duluth, and $45,000 to revalue the 28 exchanges of the Pioneer Telephone Co. and the 33 exchanges of the Central Western Public Service Co.

The value of the Tri-State company holdings for telephone purposes is not more than $14,372,901, although its net earnings of $2,210,179 constitute 38 per cent of its gross earnings, or the equivalent of the 7 per cent return on a valuation of $31,573,990.

On the found valuation of $14,372,901, the company's earnings constitute 15.37 per cent returned, and the present return of the Tri-State company is 2.195 times a fair return.

Minnesota subscribers have overpaid the companies investigated by the commission at least $1,204,076 in the last year and conditions justify a reduction of at least 21.06 per cent in existing rates and charges in the state as a whole and a much larger reduction in some individual exchanges.

Appraisal of the Tri-State company's property in Rochester will be made by the commission following the completion of similar work in St. Paul which will be about April 1, according to C. J. Laurisch, member of the commission in charge of the telephone division.

Following the appraisal in Rochester, the commission's staff will investigate the properties in another southern Minnesota city which Mr. Laurisch did not designate.

D. F. Jurgensen, chief engineer of the commission, has augmented his crew of men inventorying telephone company property preparatory to the expected legislative quiz. On authority of the commission, he has employed two additional men at salaries of $140 to $125 per month, constituting a sixth crew of workers appraising land and property and counting every piece of equipment the Tri-State company owns in Minnesota, including poles and lines.

Mr. Jurgensen already had five crews, comprising 20 men, at work on the inventory. The commission also authorized purchase of a second-hand car at a cost of $200 in connection with its investigation.

Nebraska Legislature Acts on Bills Affecting Companies.

The Nebraska senate has indefinitely postponed the Anderson bill which would have permitted cities and towns to engage in the business of supplying telephone service, with the right to issue bonds to be used in either buying or building an exchange. The introducer consented, saying he had found very little demand for it. Telephone interests massed their strength against the bill.

It was pointed out that the counties had long possessed this power, but that none had ever exercised it. On the contrary, five counties had definitely and decisively voted down proposals of that sort, even though the county is a much more natural unit of service.

Another bill inimical to the interests of the telephone industry was also killed. This would have restricted the number of hours for women employes to eight per day, and 44 per week. When it was pointed out that this would double rates in all of the small town exchanges or else force their abandonment with service given on party lines from other exchanges, the bill was immediately slaughtered.

Rural Area to Be Taken Over by Southern California Company.

A certificate has been issued by the Interstate Commerce Commission approving the application of the Southern California Telephone Co. for authority to purchase the properties of the Valley Telephone Co., which operates in a rural area of Imperial county, California.

The Valley Telephone Co. does not operate any exchanges or toll lines. It owns and operates 33 service lines, which provide farmer line service to approximately 190 subscribers in a rural section of Imperial county, California, lying east of the Alamo River. The area which it serves is approximately 9 miles in width and 28 miles in length.

Five of these service lines are connected to the Brawley exchange of the Southern California company, and 23 are connected to the Holtville exchange. Switching service is rendered to the subscribers of the Valley company by these two exchanges.

The lines in question were constructed to give service to isolated farms. They have not been maintained properly and the plant is in a deteriorated condition. Several of the lines are overloaded. This condition results in complaints, and makes it difficult for the exchanges to provide standard exchange and toll service. The people in the territory are demanding improved service. The Valley Telephone Co. is unwilling to make the additional investment necessary.

The Southern California company will take over the properties as they are, but plans to expend approximately $17,000 to metallicize the present grounded circuits and to eliminate poor maintenance conditions. None of the acquired properties will be retired from service.

On December 13, 1929, the Valley company gave the Pacific company an option to acquire all its telephone properties, free from all liens and encumbrances, for $23,000, which option was duly exercised. At the time the option was given, the Pacific company operated the exchanges at Holtville and Brawley, but on May 31, 1930, the Southern California acquired these exchanges and became the assignee and successor in interest of the Pacific company under the option.

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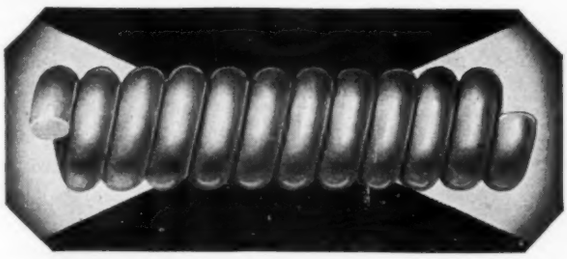

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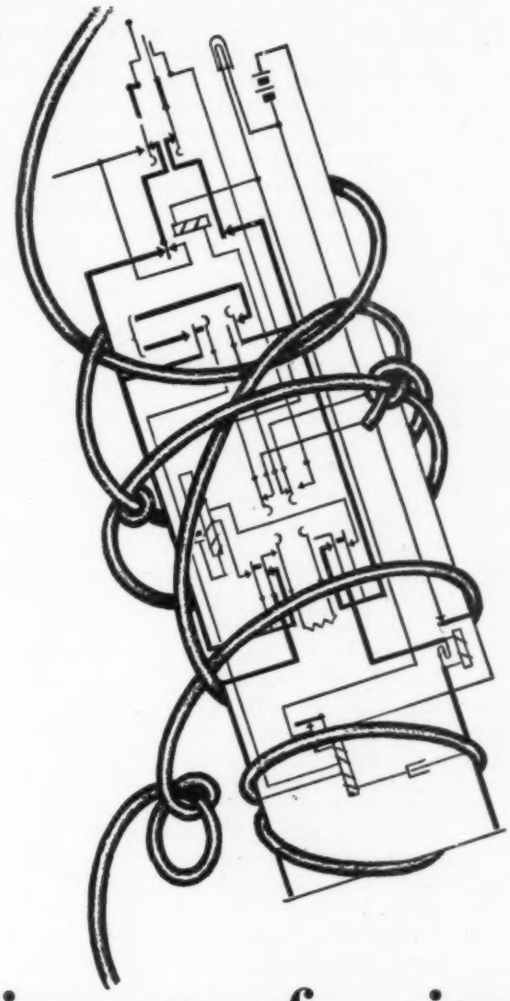

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An appraisal made by one of the engineers of the Southern California company finds the reproduction cost new of the properties to be acquired to be $63,926, and less depreciation $24,188. The properties consist of station apparatus and installations, exchange pole lines, and exchange aerial wire. In 1929, operating revenues and operating expenses of the Valley company were $6,196.31 and $5,705.58, respectively. There will be practically no change in rates.

New York Bell Authorized to Purchase Rural Company.

Approval of the transfer of the Westberne Telephone Co. to the New York Telephone Co. was given by the New York Public Service Commission on March 4. The Westberne company operates in the towns of Berne and Knox in Albany county, and in Middleburg, Schoharie and Wright in Schoharie county. The company has 145 subscribers and serves the communities of Berne, West Berne, Gallupville and neighboring rural districts.

Upon the payment of the agreed purchase price of $4,668, the property is to be conveyed to the New York Telephone Co., free and clear of all liens and encumbrances. No municipal franchises are included in the sale. The agreement provides that conveyances are to be made on or before April 30, 1931, and that after its property transfer the Westberne company will be dissolved.

Officials of the Westberne company stated that they are not desirous of spending the money necessary to give proper service which would require about $10,000. The lines of the Westberne company are connected with those of the New York company which serves adjacent territory. The latter company proposes to reconstruct the entire plant and render 24-hour service.

The present rate charged by the Westberne company is $14 per year, payable quarterly, for multi-party business and residence service. The New York company will put into effect its regular monthly minimum schedule of $2.50 for business multi-party service and $2.00 for residence multi-party service. While these rates are slightly higher than those charged by the Westberne company, the increase will be compensated for by the rendition of improved 24-hour service.

The commission held that this transfer is in the public interest, in that it will result in better telephone service for subscribers of this territory, and will permit the much needed rehabilitation of the system which is necessary in order to maintain telephone service in this territory.

Citizens of Hodgenville, Ky., Lose Suit Against Telephone Company.

In the complaint of the town of Hodgenville, Ky., et al v. the Gainesboro Telephone Co., the Kentucky Court of Appeals ruled that the town's contention, that the franchise of the telephone company was invalid, was without merit. The town filed the complaint when it was unable to collect an occupation tax from the Gainesboro company which had been granted a franchise by the citizens of Hodgenville and had paid franchise taxes to the town.

On June 16, 1925, the town of Hodgenville, by ordinance, granted a franchise to the Gainesboro Telephone Co. which authorized it to maintain and operate a system of telephones in the town. Later the city council of Hodgenville enacted an ordinance providing for an occupation tax which should be imposed upon persons, firms and corporations engaged in certain occupations.

One of the occupations was "engaging in the business of operating or carrying on a telephone exchange whereby telephone messages are received and transmitted or exchange service is furnished from a central station office for the public." The tax on that particular occupation was fixed at $50 annually. A penalty of $5 for each day the tax should remain unpaid after it became due was provided.

The Gainesboro company declined to pay the tax for two years, whereupon, the town instituted a suit to recover the amount of the tax due with penalties. The telephone company defended on the ground that it had been granted a franchise by the town, and that it was a franchise tax paying corporation and had actually paid a franchise tax to the city for the years mentioned in the petition seeking to recover the occupation tax.

The town, weakly opposing that position, attempted to build a defense upon the idea that the franchise which it had granted to the telephone company was invalid, and because of that invalidity for reasons alleged the telephone company had no franchise and could not defend on the ground that it was a franchise tax paying corporation.

Upon investigation of the matter it was found that when the franchise was granted to the telephone company, all requirements of the city ordinance were fulfilled making the franchise valid.

Summary of Commission Rulings and Schedule of Hearings.

INTERSTATE COMMERCE COMMISSION

March 13: Hearing in Washington, D. C., before Examiner Davis on joint application of the New York Telephone Co. and the Schenectady, Delanson & Esperance Telephone Co., for authority by the New York company to acquire the properties of the latter company, operating in Schenectady, Schoharie, Montgomery and Albany counties, New York.

MICHIGAN.

March 10: Hearing on petition of the Rural Telephone Co. of Stockbridge, for permission to incorporate and issue $20,000 in securities. The purpose of the request is to replace the Rural Telephone Co. of Waterloo.

MINNESOTA.

March 3: Order issued approving the joint application of the Norman County Telephone Co. and the Norman County Telephone Co., Inc., requesting the approval of sale and transfer of certain telephone property in Norman county.

MISSOURI.

February 24: Supplemental order, to commission's order of April 7, 1930, issued approving application for authority to transfer properties, rights and assets of the Midwest Telephone Co. to the United Telephone Co., and purchase by the United Telephone Co. of exchanges at Rolla, Salem, Pilot Grove, Clifton City, Pleasant Green and Calhoun; and issuance of bonds and stocks of the United Telephone Co.

NEW YORK.

March 4: Order issued approving transfer of the properties of the Westberne Telephone Co. to the New York Telephone Co. The Westberne company operates in Albany and Schoharie counties.

NORTH DAKOTA.

December 18: Complaint filed by the citizens of Stanton v. Citizens Public Service Co. requesting improved telephone service and elimination of radio interference.

February 3: Application filed by Strinden's Telephone Exchange, of Hastings, for authority to increase its telephone rates.

February 7: Woburn Rural Telephone Co., of Woburn, granted authority to abandon approximately six miles of telephone line.

February 7: Revised sheet 3 of section 8 of schedule of general rates and charges, filed by the Dakota Central Telephone Co., approved.

February 7: Application of the Central West Public Service Co. for authority to abandon its telephone exchange at Brazil and serve subscribers out of Rugby, granted.

February 7: Farmers Telephone Co., of Starkweather, authorized to change the rural discount rate from 25 cents to 50 cents per month.

February 25: Joint application filed by L. F. Chaffee and R. E. Monilaws to sell and buy, respectively, telephone property located in Wheatland and Empire townships.

March 2: Authority granted to the Hendrum Telephone Co. of Hendrum, Minn., to transfer its telephone property to the Hendrum Exchange Co.

March 2: Approval given application of the Tuttle Telephone Exchange of Tuttle, for a certificate to construct telephone lines in Township 141, Range 74 W.

March 2: Approval given the filing of installation and other general rules and charges applicable in the exchanges served by the Citizens Public Service Co. in North Dakota.

March 2: Application of Roy O. Benson, of Tuttle, for authority to dismantle certain telephone lines in Clear Lake township, granted.

March 2: Approval given the revised schedule of telephone rates applicable to Devils Lake, filed by the Central West Public Service Co.

WISCONSIN.

March 11: Hearing in Madison on application of the Farmers Union Telephone Co., of Cross Plains, for authority to increase rates and for a 5-cent connection charge between the Mt. Horeb Telephone Co., Black Earth Telephone Co. and Farmers Union Telephone Co.

March 12: Hearing in Madison on application of the Door County Telephone Co. for authority to increase rates of the Peffer line subscribers.

Channell Splicing Machine

Ten years of research and development have produced this wonderful machine for splicing telephone cable. This machine represents the greatest advance in telephone cable construction methods in years.

Cable splicing is performed in one-half the time by use of the Channell Splicing Machine. Completed splices are more uniform, better mechanically and electrically and free from wire trouble in splices.

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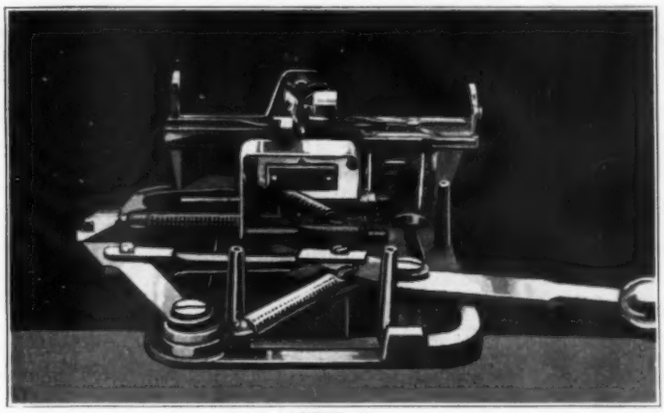

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Type of Splice	Splicing Time	Actual Time Splicer & Helper	Equiv. Value	Index	Man. Hrs. Equiv. Work Unit
*1212 Pr. Straight	4 Hrs. 31 Min.	9.04	53.33	589.	2.29
*1212 Pr. 404 Multiple	5 Hrs. 23 Min.	10.76	57.77	538.	2.51
*1818 Pr. Straight	6 Hrs. 46 Min.	13.54	79.99	589.	2.29
-1212 Pr. Straight	7 Hrs. 6 Min.	14.20	53.33	375.	3.60
-1212 Pr. 404 Multiple	8 Hrs. 15 Min.	16.50	57.77	350.	3.86
- 909 Pr. Straight	7 Hrs. 18 Min.	14.60	40.00	274.	4.92
* 148 Quad Toll	1 Hr. 44 Min.	3.46	36.41	1050.	1.29
TOTAL	41 Hrs. 3 Min.	82.10	378.60	461.	2.92

*Experienced Operator.
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R. J. MUNRO, Secretary

The advertiser appreciates your mentioning TELEPHONY.

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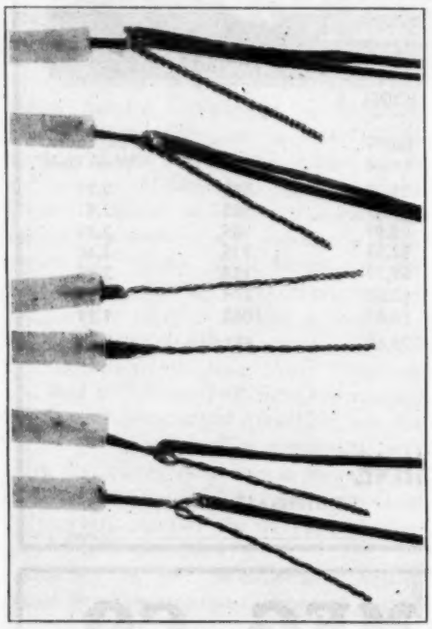
Developments in Machine Splicing of Telephone Cables.

During the past ten years, engineers and construction people in the telephone industry have exhibited a great deal of interest in the subject of machine cable splicing. This subject was first brought into prominence by J. W. Channell, 8147 Seville Ave.,



Types of Splices Made With Cable Splicing Machine.

Southgate, Calif. His invention, which was first shown publicly about ten years ago, excited considerable comment both in this country and Europe.

The perfected machine, Model G, which is now manufactured by the Channell interests is essentially the same as that developed by Mr. Channell originally, improvements having been made in design and manufacturing details. As in the original machine, the twister hooks twist the wire to be spliced in a manner which insures a much better connection both electrically and mechanically than the old hand method.

The wire is twisted off at the proper length for the completed splice. A particular feature is the special Channell twist, in which the wires are irregularly spiralled being twisted loosely at the beginning of the splice and tightly twisted at the end. This type of splice makes a connection in which the use of solder is unnecessary in the No. 19 gauge cables which heretofore have been soldered after twisting.

Mechanical and electrical tests have shown this type of splice to be superior to the hand-twisted and soldered splice.

The machine may be adjusted for splicing paper or pulp insulated cable. In splicing paper-insulated cable a small portion of the paper wrapping may be included in the twist which will prevent the insulation from unwrapping. This is not necessary in the pulp insulated wire.

The ingenious method of sliding the insulating tubes with the splice has been in use in all of the earlier models of the Channell machine, and in the later perfected model this feature has been improved.

On the latest machine, an indicating device has been perfected which notifies the operator when a bad pair is spliced in the machine.

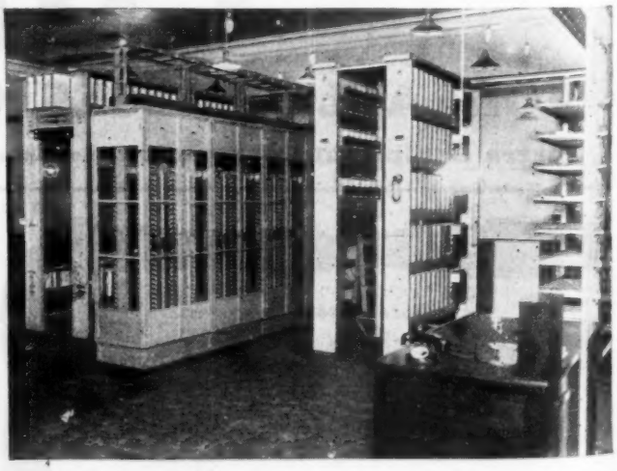
Mr. Channell has spent more than ten years perfecting the splicing machine, and he now offers to the telephone industry a perfected machine which will make all types of splices in all the usual wire sizes up to and including No. 19 gauge. The present machine is the result of his pioneering efforts and scientific research in the art of cable splicing.

Prices in the Metal Markets.

New York, March 9: Copper—Easier; electrolytic, spot and future, 10¼@10½c. Iron—Quiet; No. 2 f. o. b. eastern Pennsylvania, $16.50@17.00; Buffalo, $15.50@16.50; Alabama, $10.50@13.00. Tin—Steady; spot and nearby, $27.35; future $27.60. Lead—Steady; spot, New York, 4.60c; East St. Louis, 4.35c. Zinc—Steady; East St. Louis, spot and future, 4.05c.

Oruro, First Bolivian City to Have Dial Telephones.

The city of Oruro, Bolivia, by the recent conversion of its telephone system to Strowger automatic dial operation, classifies as the first municipality of that country to place its telephonic affairs on a modern basis. One of the most important and active Bolivian cities, Oruro, has, by this step, taken a definite part in the rapid modernization of telephone systems which is taking place throughout South America.



General View of Switchroom of New Strowger Dial Exchange in Oruro, Bolivia.

The equipment installed at Oruro consists of 800 lines of Strowger dial equipment. It was supplied by the Automatic Electric Co., Ltd., of Chicago, Ill., and was manufactured by Automatic Electric Inc. Self-aligning plunger-type line switches are used, with the usual selectors and connectors. A one-position combination toll and complaint board was also furnished.

The popularity of the monophone, which is in such evidence throughout the United States, has carried over to the South American countries as well, as is indicated by the fact that some 725 of these instruments were shipped for use in Oruro. Here, as is the case in many foreign countries, practically all service is on a straight-line basis, party lines not having come into widespread use as yet.

New Matthews Guy Guard Now on Market.

The W. N. Matthews Corp. has announced a new Matthews guy guard, known as No. 1483. These guy guards are said to be visible from any direction; front view, three inches; side view, 2¼ inches; diagonal view, 2¾ inches.

The guards may be installed from the ground on any guy without the aid of a ladder, for the only attachment necessary to make it secure is one guy clamp bolt near the ground. The strand is rigidly and automatically clamped at the upper end of the guard, and the other end of the guard is rigidly bolted to the guy clamp so that it can not twist or turn over with variation in tension of the strand.

There are four places where the guard may be attached to the guy clamp bolt, thus providing the necessary flexibility for taking care of anchor rods that may protrude 30 inches from the ground.

The guards are eight feet in length and weigh 12½ pounds each. They are so designed that they will nest 80 per cent one within another. This feature gives them a low freight classification and saves space on line trucks and in storerooms, and makes it easy to handle bundles of six.

Further details of this new guy guard may be obtained upon application to the W. N. Matthews Corp., 3722 Forest Park Blvd., St. Louis, Mo.

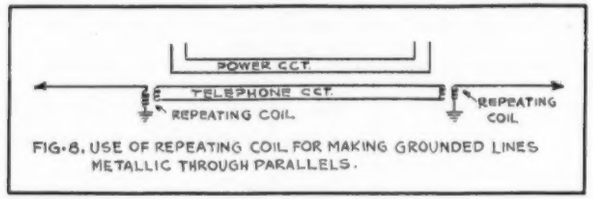


FIG. 8. USE OF REPEATING COIL FOR MAKING GROUNDED LINES METALLIC THROUGH PARALLELS.

The repeating coils used in common battery cord circuits are likewise useful for preventing unbalanced lines from upsetting balanced lines.

Toll lines involved in inductive parallels are particularly noisy when unbalanced lines are connected to them.

Another use for a repeating coil as an insulating transformer is in connection with the making of grounded lines metallic through a parallel, as shown in Fig. 8. The repeating coil keeps the ground off of the metallic portion of the line and yet permits the free passage of voice and ringing currents.

While this method is very satisfactory from the standpoint of relieving induced noise on rural lines, it is not recommended except when the power parallel represents only a small portion of the grounded line mileage, for the continuing expansion of rural power lines would indicate the necessity for metallicizing the entire length of a rural telephone line when a new parallel is created.

In connection with the use of repeating coils to permit making lines metallic through a parallel, a novel scheme has been used by some companies for temporarily reducing power noise on a multi-wire grounded leads involved in power parallels, until more permanent measures can be worked out.

This scheme consists in stringing a No. 8 or No. 10 copper wire through the parallel and connecting one side of all the coils to this wire as shown in Fig. 9. Such a plan will be recognized as nothing more or less than the old "McCluer" common return system which was used with the first telephone systems.

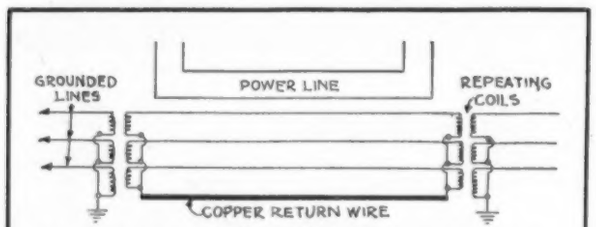


FIG. 9. USE OF REPEATING COIL AND COMMON RETURN AS TEMPORARY RELIEF MEASURE.

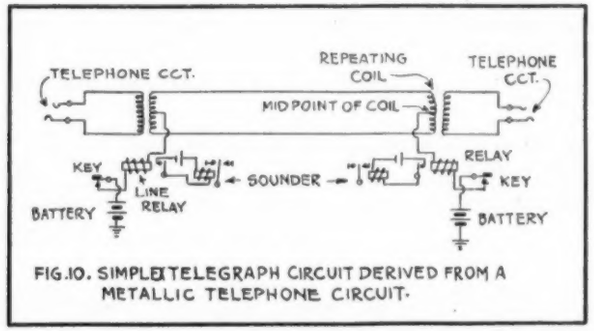


FIG. 10. SIMPLEX TELEGRAPH CIRCUIT DERIVED FROM A METALLIC TELEPHONE CIRCUIT.

Another repeating coil use as an insulating transformer is in the separation of direct and alternating currents. There are various telephone circuits in which it is desired to confine the direct current to a local circuit, but to permit the alternating voice currents to pass through any part of the circuit. The repeating coil is ideal for this purpose.

The matching of unlike impedances is a very important application of repeating coils in telephone plant and one which is often lost sight of. It is a fundamental law in connection with the transfer of energy in telephone circuits that the most efficient transfer takes place when the impedances of the two circuits connected together are equal. Equipment is designed so as to match as nearly as possible the circuits to which it will be connected.

It occasionally happens that a certain piece of equipment, or circuit, may have a considerably higher or lower impedance than the circuit to which it is connected. When this is the case, a repeating coil may be used to "match" the two unlike impedances. This application is illustrated in the use of a coil to match the output impedance of a "pick-up" coil on a cable test set (approximately 300 ohms) to the input circuit of a vacuum tube amplifier.

Failure to match impedances results in a loss proportional to the ratio of the two impedances connected together.

Simplex Telegraph Circuits From Telephone Circuits.

In Fig. 10, which shows the schematic of a telegraph circuit derived from a telephone circuit by means of simplexing, the principle is identical with that for deriving a phantom telephone circuit.

An ordinary repeating coil may be used, although in practice a special coil, known as a simplex coil, is generally specified. It is important that the two line windings of the repeating coil have identical characteristics; otherwise clicks will be heard on the telephone circuit when the telegraph circuit is in operation.

Method of Mounting and Protection of Repeating Coils.

Coils which are located in the central office are usually mounted on angle-iron coil racks when there is quite a

number of coils. In smaller offices where there are only a few coils, they can usually be mounted on a board fastened to a wall and located near the main distributing frame and cabled to it with either a small inside cable or twisted pair wire in bridle rings.

Coils located in the office should be protected by either separate protectors located on the coil-mounting board, or by utilizing vacant protectors on the main distributing frame.

Coils, which are located on poles, can be mounted either in wood cable terminal boxes, or in a housing improvised from an old 50-pair W. E. or Cook sheet iron cable terminal.

Coils located on poles should be protected by arresters on each winding which connect to an open-wire line as shown in Fig. 11. The arresters used should be a type which does not "smut" easily, otherwise considerable maintenance trouble may be experienced in keeping the lines free from grounds.

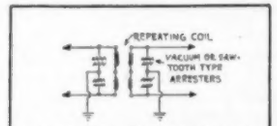


FIG. 11. LIGHTNING PROTECTION FOR COILS ON OPEN WIRE LINES.

Repeating coils used in connection with open-wire circuits have one disadvantage—that they prevent testing the lines without special testing jacks.

It is generally desirable to have phantomed and simplexed circuits terminated on special test jacks, which permit testing toward the switchboard, toward the line, and through the coils. Fig. 12 illustrates the usual arrangement of such jacks.

For the small office having only a few lines requiring test jacks of this type, the jacks can be mounted in a small cabinet using a hard rubber or bakelite panel, and the jacks connected to the coils by means of a local cable or twisted pair and ring wiring. The test cabinet should be located

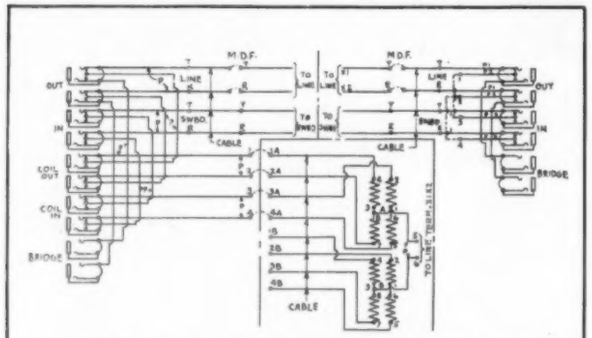


FIG. 12. METHOD OF TERMINATING PHANTOM CIRCUITS FOR TESTING PURPOSES

(Over)

CONSTRUCTION EQUIPMENT

16 new catalog sheets giving descriptions and illustrations of installation bodies, Model 30-C earth boring machine and pole setter, winches, collapsible power reel and Model "T" Crawler mounted cable reel trailer. **Highway Trailer Co., Edgerton, Wis.**

CONSTRUCTION TOOLS

"Pocket Tool Guide," a 68-page illustrated booklet giving safety rules, wire sizes and capacities of various conductors. **Mathias Klein & Sons, 3200 Belmont Ave., Chicago.**

FIBRE CONDUIT

A 12-page pamphlet fully illustrated giving specifications and a description of L-M Fibreduc. **Line Material Company, So. Milwaukee, Wis.**

LINE CONSTRUCTION

A four-page bulletin entitled, "Highway Earth Boring Machine and Pole Setter" containing many attractive illustrations and describing modern pole setting methods. **Highway Trailer Company, Edgerton, Wis.**

METERS

A 4-page bulletin, illustrating, describing and giving uses of new Weston Model 871 Output Meter for measurement of radio output voltage. **Weston Electrical Instrument Corp., Newark, N. J.**

SAFETY BELTS AND STRAPS

Bulletin No. 1130, 10 pages, illustrated—full information on harness leather, its characteristics, necessary care and safety factors, particularly as applied to linemen's belts and safety straps. **Mathias Klein & Sons, 3200 Belmont Ave., Chicago, Illinois.**

TREE TRIMMING

An 8-page booklet entitled "Trimming Trees for the Electric Wires", a reprint of a speech by M. L. Davey over the National Broadcasting Co. radio network. Designed to create a more friendly relationship between public utilities and the owners of trees through which telephone lines have to be strung. **The Davey Tree Expert Co., Kent, Ohio.**

When writing please mention TELEPHONY

MANUFACTURERS' LITERATURE

The following is a brief description of recently published bulletins, catalogs, etc. If you are interested in obtaining copies address your request to the manufacturer.

Notices Not Previously Published

GUY GUARDS

Attractively illustrated pamphlet describing outstanding features and installation details of new Matthews Guy Guard. **W. N. Matthews Corp., 3700 Forest Park Blvd., St. Louis, Missouri.**

PLIERS

An illustrated catalog of 36 pages giving detailed specifications of many different styles and sizes of Vacuum Grip Pliers. **Forged Steel Products Co., Newport, Pa.**

Notices Previously Published

BLUE-PRINTING

Catalog M-29, a 100-page booklet fully illustrating and describing a complete line of blue-printing machinery, blueprint paper, drafting room furniture, etc. **The C. F. Pease Co., 804 N. Franklin St., Chicago, Ill.**

CABLE SPLICER TENTS

Catalog No. 29-G, a 66-page illustrated catalog entitled, "Tents and Canvas Products, Bleacher Seats and Covers." Contains description of cable splicer tents. **U. S. Tent & Awning Company, 701-709 No. Sangamon St., Chicago, Ill.**

CLAY CONDUIT

A new 32-page catalog, amply illustrated and fully descriptive, on clay conduit for telephone cable. **Shawmut Clay Mfg. Co., St. Marys, Pa.**

When writing please mention TELEPHONY

"Telephony's" Engineering Data.

By B. C. BURDEN.

near the wire chief's testing unit and the tip and ring test leads connected to a special jack in the cabinet. Lines are tested by using patching cords to connect the special jack to the lines under test.

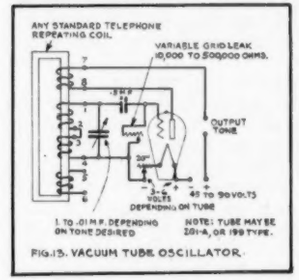
Repeating Coils in Vacuum Tube Audio Oscillators.

In addition to its many other uses the repeating coil can be used in connection with a vacuum tube to produce a tone for general testing purposes.

Fig. 13 shows the circuit of a one-tube oscillator using an ordinary telephone repeating coil. This arrangement can be made to produce almost any desired frequency in the audio range; and by means of a variable resistance control, an interrupted tone can be obtained.

The oscillating circuit shown is of the well-known "plate feed-back" type and operates as follows:

Any initial voltage surge, such as might be caused by closing the filament circuit, will cause this voltage change to be impressed across the grid circuit, due to the magnetic coupling between plate and grid circuits. This change in the grid circuit voltage affects the current flowing between filament and plate, resulting in an amplified version of the change appearing in the plate circuit. This amplified current change is again fed back to the grid circuit by the inductive coupling between the plate and grid windings, and a continuous series of pulses between grid and plate circuits is thus established. The amplitude of these oscillations will depend upon the tube characteristics.


ANY STANDARD TELEPHONE REPEATING COIL
VARIABLE GRID LEAK 10,000 TO 500,000 OHMS.
OUTPUT TONE
2½ VOLTS DEPENDING ON TUBE
45 TO 90 VOLTS
1 TO .01 M.F. DEPENDING ON TONE DESIRED
NOTE: TUBE MAY BE 201-A, OR 199 TYPE.
FIG. 13. VACUUM TUBE OSCILLATOR

It is important that the grid and plate circuits be properly "poled," otherwise the grid and plate currents will be out of phase and oscillations can not be set up. By connecting to the repeating coil punchings, as shown in the diagram, this will be accomplished.

The frequency of the generated tone will depend upon the capacity shunting the grid coil. The highest frequency will be obtained without any shunting capacity, for under this condition the inductance of these windings is paralleled by only the distributed capacity of the windings themselves.

The interrupted tone is obtained by increasing the resistance of the variable grid leak to a high value. This causes the tube to block until the negative charge on the grid side of the condenser has leaked off through the "grid leak." Interruptions from a fraction of a second to several seconds can be obtained by this arrangement. This makes the arrangement very suitable for the location of cable faults.

Condensed Telephone News

Companies Are Urgently Requested to Forward to Us Promptly News Concerning Construction, Rebuilding, Financing, Election of Officers, Sales and Purchases of Exchanges or Other Activities

New Incorporations and New Telephone Companies.

NEW ROSS, IND.—Articles of incorporation have been filed with the secretary of state in Indianapolis by the New Ross Co-operative Telephone Corp. The corporation has an initial capital stock of 175 shares having a declared par value of $40 a share. It is formed to own and operate telephone lines and exchanges in Montgomery, Boone and Hendricks counties.

The board of directors is composed of James Porter, M. L. Nees, W. E. Evans, D. W. Lane, George W. Marker, Harmon Rogers, B. G. Collings, J. C. Hunt, H. W. Lane and Charles E. Jones.

MACEDONIA, IOWA.—Articles of incorporation of the Macedonia Telephone Co. have been filed with $8,000 capital. J. B. Denton is president; Valentine Plumb, vice-president; Fern Bisbee, secretary-treasurer. These officers with A. C. Lewis, Willoughby Dye and C. H. McCready comprise the board of directors.

KARLUS, KY.—The Concord-Ono Telephone Co. of this place has been incorporated with a capital of $100.

The incorporators are: H. B. Popplewell, J. C. Nelson, George Dabney, Elmer Hughes, Elmer Eastham, W. H. Chrisman, Ray Chrisman, Mrs. Sophia Dockery and O. L. Popplewell.

Financial.

CHICAGO, ILL.—Stockholders of the Associated Telephone Utilities Co. at the annual meeting called for April 15, will vote on amendment to articles of incorporation extending the period within which the $6 convertible preferred stock series A may be converted into two shares of common from December 31, 1931, to December 31, 1932, after which the stock may be converted into 1⅔ shares of common.

BOSTON, MASS.—A certificate of increase of capitalization from $150,000,000 to $200,000,000 has been granted to the New England Telephone & Telegraph Co.

Under provisions of the certificate, the company is authorized to issue 500,000 shares of the same par value already approved. Application for the increase was signed by M. B. Jones, president, and C. F. A. Siedhof, secretary.

WESTPHALIA, MICH.—That 1930 was a prosperous year for the Westphalia Telephone Co. was evidenced when 8 per cent dividend checks were issued to the stockholders at the annual meeting. Reports showed that although expenses mounted during the past 12 months, business increased also, with the company showing a good profit for the year.

Bernard Bengel, the only director whose term of office expired, was reelected. Officers for the ensuing year will be named later after the board of directors meet.

ROCK DELL, MINN.—A dividend of $3.00 was declared on the stock of the Farmers Interurban Telephone Co. at the annual meeting.

Total receipts, according to the report of A. S. Berge, treasurer, were $7,197.24 and disbursements, $5,560.24, leaving cash in treasury of $1,637. Deducting unpaid dividends of $126 leaves a balance of $1,511. Accounts receivable are $609.70 and material on hand is valued at $209.

TYLER, MINN.—At the annual meeting of the Tyler Telephone Co. a dividend of 6 per cent was declared. Plans were also discussed for purchasing the telephone exchange at Florence.

Construction.

SYCAMORE, ILL.—A report submitted at the annual meeting of the DeKalb Ogle Telephone Co. showed that $73,881 were expended for extensions and betterments during the year 1930.

Other statistics announced at the meeting were: Average number of local messages per month, 1,226,160; average number of toll messages per month, 34,384; number of stations at end of year, 9,889.

Construction for the coming year includes installation of new central office equipment at Mount Morris together with the usual necessary upkeep and maintenance for the entire system. The company has an average number of 160 employes.

NEW YORK, N. Y.—The expenditure of $3,492,295 for new construction throughout the state was authorized by the board of directors of the New York Telephone Co. at the regular monthly meeting held February 25, according to an announcement made by J. S. McCulloh, president. This brings the total appropriations for the first two months of this year to $9,215,385, of which $7,162,685 has been provided for the extension of facilities in the metropolitan area.

IRVING, TEXAS.—The Southwest Telephone Co. has just completed and placed in operation a new system costing in excess of $50,000. The modern building is frame and cost approximately $3,000. Equipment installed exceeds $16,000 and new lines, poles and cables cost about $30,000.

To put the new system into use, about 18,000 feet of new cable were laid and one car of galvanized iron wire was used as well as two carloads of creosoted poles and a carload of other equipment.

There are 135 telephones in the city limits of Irving, in whose corporate limits are 730 people, or one telephone to every five and a half persons. There are 150 rural telephones in addition. The system has grown 15 per cent in the last five years.

The local manager for the Irving telephone system is Mrs. Nellie Long.

MUSCODA, WIS.—The Commonwealth Telephone Co. of Madison plans to make extensive improvements to the local telephone system.

ASHLAND, OHIO.—At the annual stockholders' meeting of the Star Telephone Co. announcement was made that the company would spend $10,000 in underground cable construction this year. Cables will be placed underground in North Cottage street, Ohio street, and West Sandusky street. It was also decided to spend more than $1,000 in underground work at Creston.

Elections.

SYCAMORE, ILL.—The annual meeting of the stockholders of the DeKalb-Ogle Telephone Co. was held last month. The officers and directors reelected for the coming year are: J. C. Joslyn, president; Ira A. Wetzel, vice-president; W. M. McAllister, treasurer; H. A. Joslyn, general manager and secretary; Mrs. Marie J. Mc-

FLEXIBILITY!

Build Many Sizes of Concrete Manholes with one Set of Forms

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TYPE "B"—3 ft. 6 in. wide, 6 ft. long, 5 ft. headroom.

TYPE "J-3"—3 ft. 6 in. wide, 8 ft. 6 in. long, 5 ft. 6 in. headroom.

TYPE "J-4"—4 ft. wide, 8 ft., 8 ft. 6 in. or 9 ft. long, and 5 ft. 6 in. headroom.

This extreme flexibility assures a big saving of time, material and labor. Penote Universal Forms built of steel, are practically indestructible. With the hammer as the only tool, Penote Universal Forms are quickly installed and removed from the excavation, and with their use manholes are poured complete in one operation. You'll build more manholes at less cost with Penote Universal Forms. Write today for full information and quotations.

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Kee, assistant treasurer and Miss Clara B. Wheeler, assistant secretary.

Directors: E. R. Cogswell, A. R. Bone, W. M. McAllister, Ira A. Wetzel, H. M. Whittemore, N. B. Westlake, F. E. Brower, H. A. Joslyn and J. C. Joslyn.

MT. SUMMIT, IND.—The Mt. Summit Rural Telephone Co. has elected W. L. Province president and manager to succeed Dr. L. C. Marshall, who has successfully managed the company for a period of seven years and who resigned from the board of directors voluntarily.

The company has grown each year that Dr. Marshall has been its president and manager and the year 1930 was the banner year. Ralph Harvey was elected vice-president and J. B. Rifner, secretary, treasurer and clerk.

BELKNAP, IOWA.—At a meeting of the Belknap Telephone Co. the following officers were reelected for another year: President, Elroy Hancock; vice-president, Gene Runkle; secretary, Esther Bell; treasurer, Orvilie McCreery; operator, Emma Hawkins.

CALAMUS, IOWA.—At the annual meeting of the stockholders of the Farmers' & Business Mutual Telephone Co. officers were reelected as follows: President, George Raiber; vice-president, Charles Dickel, Wheatland; secretary, Carl Lohman, Wheatland; treasurer, William F. Siegmund, Calamus.

LELAND, IOWA.—Officers elected at the meeting of the Leland Mutual Telephone Co. were: T. T. Carlson, president; O. H. K. Eidahl, vice-president; O. Michaelson, secretary-treasurer; George Jorgenson, director; F. W. Bowman, lineman.

LONE TREE, IOWA.—At a meeting of the Lone Tree Telephone Co. the following officers were elected: President, John Kline; vice-president, John Krall, secretary and treasurer, Sam Alexander.

MONTOUR, IOWA.—Officers of the Farmers Mutual Telephone Co. were reelected at the recent annual meeting as follows: Jonas Dunham, president; J. E. Rouse, vice-president; E. S. Smith, treasurer and A. I. Smith, trustee.

NAPIER, IOWA.—The Napier Telephone Co. at its recent annual meeting elected the following directors: James Sorenson, Verne Kingsbury, Floyd Miller, W. A. L. Gossett, Clarence Cooper, Riley Ball and Alfred Anderson. A change of routes into Ames was discussed at the meeting.

NEVINVILLE, IOWA.—The annual meeting of the stockholders of the Nevinville Telephone Co. was held recently. The three members of the board of directors with terms expiring were Henry Everling, Wilton Ball and Grant Carson. Mr. Everling and Mr. Ball were reelected and James Kralik was elected in Mr. Carson's place. They were elected for a term of three years.

RADCLIFFE, IOWA.—The stockholders of the Radcliffe Mutual Telephone Co. held their annual meeting and elected the following officers and directors for the ensuing year:

President, C. G. Weimer; vice-president, W. B. Gilliam; treasurer, H. A. Drake; secretary, A. B. Narland; directors, C. E. Myers, E. T. Rorem, M. W. Grua, M. G. Sevold, and Olaus Rorem.

HOMER, MICH.—The Calhoun County Telephone Co. here has reelected the following officers for the coming year: President, B. F. Woodbury; vice-president, R. D. Gardner; secretary and treasurer, R. C. Smith; manager, F. J. Ashley. Last year's report read by the secretary, showed the company to be in good condition.

NATHAN, MICH.—The Faithorn-Dagett-Nathan Telephone Co. held a stockholders' meeting and reelected officers as follows: Paul Perizo, of Daggett, president; Clarence E. Harter, Norway, vice-president, and C. W. Wilkins, Nathan, secretary-treasurer.

ATKINSON, MINN.—The annual meeting of the Pioneer Rural Telephone Co. was held here with new officers being elected as follows: Abraham Nasenious, president; Ragner Johnson, secretary; Harold Anderson, treasurer.

Retiring president and secretary were Charles E. Johnson and Oscar R. Lycander, who have served for the last 20 years as officers. The company decided to let the Bell telephone company take charge of its line from Carlton to Mahtowa.

EYOTA, MINN.—G. L. Wood was elected president of the Viola Telephone Co. at the annual meeting here.

Other officers elected were William F. Schmidt, vice-president; August Beck, treasurer; Louis Hammel, secretary and manager; Mr. Beck, Mr. Wood, E. A. Steichen, A. W. F. Schmidt, and Mrs. Schmidt, directors.

Mrs. G. M. Feery and Miss Vivian David will be operators and James McAdam, lineman.

HUTCHINSON, MINN.—The stockholders of the Hutchinson Telephone Co. met and reelected P. J. Kaer, Paul Chernausek, H. L. Merrill, H. W. Mergen and W. S. Clay directors.

Immediately afterwards the directors met and elected P. J. Kaer, president who takes the office held by the late W. E. Harrington. Paul Chernausek was reelected vice-president; H. L. Merrill, treasurer; H. W. Mergen secretary, and W. S. Clay, general manager.

The usual dividend to stockholders was declared at the directors' meeting.

ROCK DELL, MINN.—At the annual meeting of the Farmers Interurban Telephone Co., directors elected are T. O. Thorson, August Scharberge, A. S. Berge, Ole Benson, William L. Brakke, A. L Snesrud and Oscar Gulbranson.

ST. JAMES, MINN.—The St. James Telephone Co., held its annual stockholders' meeting and elected the following officers for the ensuing year: Dr. A. Thompson, president; J. C. Ranseen, vice-president; Willard D. Forsyth, manager; P. N. Sterrie, treasurer.

Directors: N. J. Nelson, Otto Wenstrom, C. E. Fuller, O. P. Anderson, J. L. Lobben, John Krouhn, Louie Movitz, and E. H. Torkelson.

SPICER, MINN.—At the annual business meeting of the Spicer & Willmar Telephone Co. President G. J. Bratberg, presided. The reports of the secretary and treasurer were read and approved, after which officers were elected.

The same board was chosen to head the organization during the coming year, the officers being C. J. Bratberg, president; M. A. Knutson, vice-president; Alfred Estwik, treasurer; B. C. Overson, secretary; Frank Pitcher, director.

GRANT CITY, MO.—At the annual meeting of the Grant City Telephone Co. all the old officers were reelected. Directors are S. W. Lowry, Clark Gardner, W. V. Hauber, J. C. Jamison and J. W. Barker. The former was reelected president of the board and Mr. Gardner continues as secretary and treasurer, a position he has held for 24 years.

BELLEMEAD, N. J.—At the annual meeting of the Hillsborough & Montgomery Telephone Co. the following officers and directors were elected:

President, Peter A. Garretson; vice-president, Fred R. Dixon; secretary, Russell I. Cruser; treasurer, John E. DeHart; directors, L. R. H. Labaw, Russell Cruser, William M. Funkhouser, Peter A. Garretson, Clarence R. Covert, Louis E. Opie, F. R. Dixon. The superintendent and manager is Peter A. Garretson.

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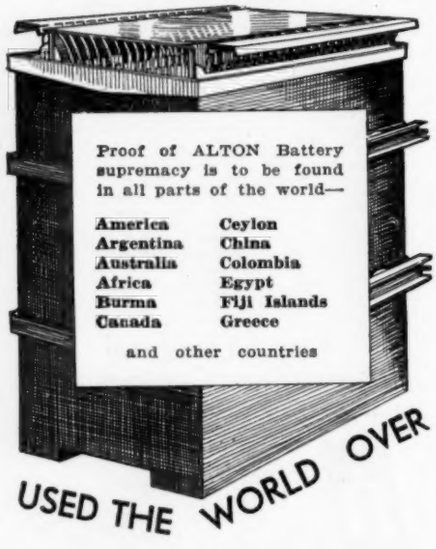

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THEODORE GARY AND COMPANY
KANSAS CITY, MISSOURI

Ninety-First Consecutive Quarterly Dividend

The regular quarterly dividend for quarter ending March 31, 1931 of 40c per share on the No Par Preferred Stock has been declared payable April 1, 1931 to stockholders of record as of the 16th day of March, 1931 at 3 P. M. The usual dividend on the Common Stock has been declared payable April 1, 1931 to stockholders of record as of the 31st day of March, 1931.

March 5, 1931

(Signed) C. A. BENNETT,
Senior Vice-President and Treasurer.

The advertiser appreciates your mentioning TELEPHONY.

HILLSBORO, N. D.—At the annual meeting of the stockholders of the Traill County Telephone Co., Earle R. Sarles was named president. Other officers are A. L. Lien, vice-president; and A. T. Nicklawsky, secretary-treasurer.

Those named to the board of directors are A. L. Lien, O. P. Satrom, P. S. Peterson, N. D. Nelson, A. T. Nicklawsky, W. C. Henning and E. R. Sarles.

ARCADIA, OHIO.—The Arcadia Mutual Telephone Co. has elected C. M. Dicken, president; A. L. Anderson, secretary-treasurer; Sherman Huffman, Rush Taylor, A. D. Rainey, Jesse Metzger, G. W. Dick, D. E. Pepple, Charles Myers, R. L. Graham, L. M. Orth, H. K. Fisher, T. H. Zeller, Lloyd Anderson and J. S. Smart, directors.

ASHLAND, OHIO.—At the annual meeting of the stockholders of the Star Telephone Co. all the old directors were reelected as follows: E. E. Brown, C. R. Freer, S. H. Crabill, Henry W. Guth, C. W. Landis, all of Ashland; J. H. Rickard of Wadsworth; Charles Rowland, of Lodi.

S. H. Crabill was reelected president; C. R. Freer, vice-president; Charles W. Good, secretary and general manager; George R. Freer, treasurer; J. H. George, assistant manager; E. H. Ritter, auditor and A. D. George, superintendent of construction.

CONNEAUT, OHIO.—Stockholders of the Conneaut Telephone Co. held their annual meeting and reelected the board of directors and officers as follows:

Directors: William H. Brown, R. E. Cummins, Joe Goebricher, T. R. Hatch, Gustav Hirsch, A. J. Packer and Dr. B. M. Tower. Officers: William H. Brown, president; Gustav Hirsch, vice-president; T. R. Hatch, treasurer; Russell Goebricher, secretary and general manager.

CONTINENTAL, OHIO.—F. A. Henry has been elected president of the Farmers' Mutual Telephone Co. here with August Vennekotter, vice-president; Lucille Kaufman, secretary-treasurer; R. T. Means, general manager.

OTTAWA, OHIO.—At the annual stockholders' meeting of the Putnam County Telephone Co. officers were elected as follows: George Martin, Columbus, president; W. H. Snook, Columbus, vice-president; R. L. White, Toledo, secretary-treasurer; R. T. Means, Leipsic, general manager; Lois M. Stough, Ottawa, assistant secretary.

SYCAMORE, OHIO.—The newly elected board of directors of the Sycamore Telephone Co. at a recent meeting named Anson Bloom, president; Dr. C. W. Montgomery, vice-president, and Robert Parker, secretary-treasurer.

The board decided to repeat its action of January 1 by allowing an extra 50-cent discount on the April 1 bills. This makes the cost of a residence telephone if paid before April 15 only $1.25.

VANBUREN, OHIO.—The Vanburen Mutual Telephone Co. held its annual meeting and elected J. C. Kissell president and L. A. Heminger secretary-treasurer and manager.

The board of directors elected were: J. C. Kissell, B. L. Foust, Charles Flanigan, M. R. Hess, and L. A. Heminger.

LOTTSVILLE, PA.—The annual meeting of the Lottsville Telephone Co. has been held and the officers of the past year were reelected as follows: President, Ernest G. Brown; vice-president, R. E. Dyke, secretary, Allan M. Baker; treasurer, Mrs. Merrie Dillenbeck; directors, John F. Quanabush and Edmond Woodburn; switchboard committee, R. E. Dyke and E. A. Baker.

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CAMERON, W. VA.—The annual meeting of the United Farmers Telephone Co. was held recently and L. O. Bonar was reelected president; Isaac Pletcher, vice-president; J. M. Marshall, treasurer, and Mrs. D. D. Gump, secretary.

The board of directors are as follows: L. O. Bonar, Isaac Pletcher, J. M. Marshall, W. R. Hicks, Geo. E. Todd, John Todd, A. A. Porter, Geo. E. Fish, I. G. Logston, Wm. T. Moore.

The company had a very good year during 1930 and is planning many improvements for 1931. It was organized here 24 years ago and has over 600 subscribers.

ALBANY, WIS.—Officers of the Attica Mutual Telephone Co. elected at the annual meeting are: P. H. Root, president; William Swann, vice-president; R. Swann, secretary; William Ramsey, treasurer; Herman Klitzman, director.

AMHERST, WIS.—At a meeting of the Amherst Telephone Co. all officers and directors were reelected with the exception of John Jordan, director, who has moved to Waupaca. Dr. F. Metcalf was elected to fill the vacancy.

The holdover officers and directors are: President, A. L. Rounds; secretary, O. R. Barber; treasurer, C. P. Somers; directors, O. K. Heath, Ernest Kussman.

ARCADIA, WIS.—At the annual meeting of the Tamarack Telephone Co. the report of the secretary showed that the business of the past year was very satisfactory and that it was being conducted in an economical and efficient manner. In consequence, the same officers and directors were reelected as follows:

President, L. K. Strand; vice-president, Ole A. Olson; secretary, James Brownlee; treasurer, Ed. Hess; additional directors, Simon Sonsalla and Simon Knusella.

BURLINGTON, WIS.—Stockholders of the Burlington, Brighton & Wheatland Telephone Co. have held their annual meeting and the financial report showed that the company had enjoyed a very successful year. Officers were elected as follows: President, Henry Wehmhoff; vice-president, H. Runkel; secretary and treasurer, George Waller; director, Ernest Schultz.

CLAYTON, WIS. — C. F. Paulson was elected president of the Clayton Rural Telephone Co. at its annual meeting. Other officers elected are:

Andrew Rue, vice-president; George Ketz, secretary; Walter Glowie, treasurer. On the board of directors are Henry Barthman, August Meyer, W. G. Paulson, Henry Olson and John Edwards.

FOOTVILLE, WIS.—The annual meeting of the Footville Telephone Co. was held and the same officers reelected: E. A. Silverthorn, president; C. H. Walker, vice-president and manager; W. A. Canary, secretary-treasurer.

Miscellaneous.

FRUITDALE, ALA.—The Miller Telephone Co. is reported to have been purchased by the Frankville Telephone Co., of Frankville.

OMAHA, NEB.—Frank Milhollan, president of the Central West Public Service Co., announces the purchase by his organization of 21 companies in Virginia, West Virginia and North Carolina, in contiguous territory. The properties serve more than 80 communities with a population of 150,000. The Virginia properties will be operated under the name of the Southeast Public Service Co. of Virginia, and the others by the Southeast Public Service Co..

WESTBORO, WIS.—The Westboro Telephone Co. has been sold to the Rib Lake Telephone Co., Rib Lake, of which Edward Eckhoff is manager.

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